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# Research Digest 1986-1988



Addiction  
Research  
Foundation

Fondation  
de la recherche  
sur la toxicomanie



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# Research Digest 1986-1988



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The misuse and abuse of alcohol and other drugs continue to exact a heavy toll in Ontario. Fully 67 per cent of Ontarians report that a family member or close friend has experienced problems due to the use of alcohol, illegal or prescription drugs. The associated economic burden is staggering: excess costs for health care and law enforcement and lost productivity amounted to an estimated \$ 9.125 billion in 1986/87, the most recent year for which estimates are available.

As Ontario's statutory addictions agency, it is the mission of the Addiction Research Foundation (ARF) to help reduce this pain, suffering and lost human potential. Since 1949, the ARF has been working with considerable success to gain a better understanding of the nature and extent of addictions problems, to identify and promote effective treatment methods, and to educate Ontarians on addiction problems and how they might best be controlled and prevented.

### **Goal-driven Research**

As its name suggests, the core of the ARF's work is research. Scientific research — the process of systematically creating, compiling, analyzing and sharing knowledge — enables the Foundation to progress toward its four program goals:

- to increase understanding of the problems associated with the use of alcohol and other drugs
- to improve the quality and accessibility of treatment and rehabilitation services
- to increase the accessibility of effective prevention programs
- to increase public awareness and knowledge and to motivate appropriate action by individuals and institutions alike.

The ARF's research agenda is set through a rigorous selection process. Before any research project is initiated, management evaluates it to ensure the project meets the priorities set for the Foundation's work. It is also subjected to an internal and external peer review to assess whether it will make a significant contribution to increased knowledge in the field, and to ensure that it has been designed to follow accepted scientific methodology. If the research involves patients or volunteer subjects, it is assessed for its ethical acceptability. Those ARF scientific projects funded in whole or in part by external grants also go through an exhaustive external adjudication process.

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- Social and Biological Issues
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As part of the ARF's annual program planning process, each continuing project is subjected to careful scrutiny to determine whether it is consistent with current Foundation priorities and whether sufficient progress is being made to justify continuation. In addition, an external research audit is conducted every five years to assess the relevance and the quality of ARF science. The most recent audit, completed in 1988, found that the Foundation is deploying its research resources efficiently and effectively.

#### **Knowledge Shared**

*Conducting relevant research is one part of the research agenda; making good use of the results is another.*

Conducting relevant research is one part of the research agenda; making good use of the results is another. It is the Foundation's job to ensure that the knowledge generated by its scientists is shared. ARF scientists published in professional journals and presented over 700 papers between 1986 and 1988. Within the Foundation, research results are shared with staff in all areas: other researchers, treatment services workers, prevention and health promotion programmers and community consultants in the ARF's offices across the province. This knowledge is the cornerstone in the design and implementation of the ARF's programs. It also provides the basis of the information and advice provided by the ARF to a vast array of clients in Ontario: policymakers, health and social service professionals, the judiciary, business and industry leaders, educators and community leaders and the general public. The ARF's School For Addiction Studies provides training for some 3500 professionals annually.

The Foundation's research relates specifically to Ontario but it has national and international relevance as well. Since 1977, the ARF has been a World Health Organization (WHO) Collaborating Centre for research and training on alcohol and drug-dependence problems.

#### **ARF Research 1986-88**

This edition of the ARF's *Research Digest* provides an overview of the Foundation's scientific work over a two-year period, from April 1, 1986, through March 31, 1988. The Table of Contents lists all studies, organized according to goal area, with subsections for different lines of research activity. Individual entries report, in a brief and accessible manner, on the purpose, methodology and potential benefits of specific research projects. In each case, researchers are listed along with a selected bibliography and any grants received to support the work. Subject and author indices provide another guide to the *Digest*. Armed with these resources, individuals or organizations seeking more information on a particular issue, subject or study will be able to find it with relative ease.

The 122 projects included here demonstrate the breadth and depth of the ARF's research work and the productivity of Foundation scientists. More importantly, they represent a significant contribution to our understanding of the kinds of strategies and programs that can help to control and prevent problems arising from the abuse of alcohol and other drugs.

### **Knowledge applied**

The practical applications of the ARF's research are demonstrated in every area of the Foundation's work. For example, for the last 10 years, the ARF's scientists have been studying the use of alcohol and other drugs among Ontario students and adults. Such information allows policymakers, treatment professionals, educators and community programmers to assess the efficacy of current interventions, and to identify issues and populations for future priority attention. The most recent student and adult studies, published in 1987, confirmed encouraging downward trends in cannabis use; they also provided sobering indications on levels of alcohol use.

The ARF's biomedical research has resulted in some major discoveries. In 1987, the ARF's scientists published the results of a long-term study on the use of propylthiouracil (PTU) in the treatment of alcoholic liver disease. This research began in 1972 with basic research on liver function in rats and culminated in a seven-year clinical trial which indicated that PTU treatment can reduce annual death rates due to alcoholic liver disease by 50 to 60 per cent. The potential benefits of this research are enormous. Each year, between 100,000 and 200,000 people world-wide die from alcoholic liver disease. PTU treatment could save as many as half of these lives. This work is an example of how long-term laboratory research can lead, in time, to breakthroughs of immense practical benefit.

Much of the ARF's research has more immediate applications, with direct social and economic benefits to Ontario. The ARF's scientists have determined, for example, that community-based treatment centres such as those promoted and funded by the Ontario Ministry of Health are at least as effective in treating people with alcohol problems as in-patient hospital-based methods. The ARF's researchers are also collaborating with the Ontario Ministry of Health to develop a treatment services planning model that will help determine the number, location and capacity of treatment services required throughout Ontario and the gaps in service which currently exist.

*The Foundation's research relates specifically to Ontario but it has national and international relevance as well.*

A growing societal commitment to prevention and health promotion has brought with it a need to understand special populations and to identify those preventive strategies and programs that can best serve them. Between 1986 and 1988, the ARF's scientists were involved in studies of alcohol and other drug use among Ontario's seniors, battered women and students at all levels. Evaluative studies of innovative policy initiatives, such as alcohol server intervention, and alcohol and drug policies in primary and secondary schools were conducted. Formative research continued on a health promotion program for employees. Work of this nature enables the ARF to develop model prevention and health promotion programs that can then be used by various community organizations and groups across the province.

*Much of the ARF's research has more immediate applications, with direct social and economic benefits to Ontario.*

#### **Information Needs Met**

While the vast majority of the ARF's research work is project-specific, Foundation researchers also respond to the constant demand from government, researchers, local planning bodies, the media and the general public for scientifically accurate information on a wide range of addictions topics. The ARF maintains a Statistical Information Service, and in addition, provides its best advice to government officials and community groups on a variety of specific addictions issues. The ARF's work in relation to Human Immunodeficiency Virus (HIV) infection among injection drug users is a case in point.

The Foundation also compiles research information and makes it generally available through a number of different vehicles: the *Research Digest* is published every two years; the ARF Library is open to the public year-round; and, two ARF periodicals, *The Journal* and *Ontario Report*, are distributed monthly to thousands of subscribers in Ontario as well as across Canada and abroad.

#### **Knowledge empowers**

As the above examples illustrate, knowledge is empowering: it enables society to better understand and more effectively address its problems. Such has been the effect of the ARF's research in Ontario over the past four decades. Taken together, the ARF's research activity from 1986 to 1988 is testament to the Foundation's continuing commitment to the pursuit of knowledge through the application of scientific methods. This edition of the ARF's *Research Digest* will shed some light on the progress the Foundation's scientists are making to further empower Ontario and Ontarians to more effectively control and prevent substance abuse in the years ahead.

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## ***Goal 1: To develop a better understanding of the hazardous use of alcohol, tobacco, and other drugs, and the damage caused by such use.***

The ARF's social and biological research is intended to contribute to the knowledge base necessary for the development of more effective and/or efficient methods for the prevention, identification, and treatment of addiction. There are five major areas of study:

One area concerns itself with drug use and problem patterns among the general population in Ontario and among those at risk and in need:

- adolescents
- youth
- seniors
- people with health problems
- drivers
- families experiencing family violence

The ARF has also been studying alcohol and drug control measures with highest priority being given to policies most applicable in Ontario.

Behavioural and biological mechanisms that affect how and why people use alcohol, tobacco and other drugs comprise the third major area of study. The ARF has placed particular emphasis on:

- immunological techniques to suppress alcohol consumption
- the role of brain chemistry and physiology in maintaining alcohol and drug use
- the role of behavioural factors in maintaining alcohol and drug use
- self-administration models of alcohol and other drugs in humans and animals
- experimental assessment of the dependence liability of drugs, including prescription drugs

Use and problem patterns



Control measures



Reinforcement and self-administration



Processes of addiction



Damage to vital organs

The ARF is also studying the processes of addiction: the behavioural and biological mechanisms that govern tolerance to, and physical dependence on, alcohol and other drugs, with particular emphasis on:

- tolerance and dependence as causes of alcohol and drug use
- tolerance and dependence as consequences of alcohol and drug use
- cross-tolerance

The final major area studies the nature and causes of damage to vital organs, placing particular emphasis on:

- the liver
- the central nervous system

## Use and Problem Patterns

1

### Alcohol and Drug Use Among Ontario Students

Data on alcohol and drug use among Ontario students are needed to inform researchers and policymakers of the current status of drug use and associated problems. Surveys of this population have been conducted on a biennial basis since 1977.

#### Research

Data from the 1987 survey are derived from 4,267 students (in grades 7, 9, 11 and 13) in 25 boards of education located in all regions of Ontario. Since 1977 the surveys have enquired about the frequency of use of the following: alcohol, tobacco, cannabis, LSD, other hallucinogens, cocaine, glue and other solvents, heroin, speed, and the medical and nonmedical use of tranquillizers, barbiturates and stimulants. The 1987 survey also enquired, for the first time, about the use of smokeless tobacco, crack and very-low-alcohol beverages. A special study was also made of ethnic differences in drug-related problems. The data analysis from this survey includes trend analyses based on surveys since 1977.

In 1987, the decline in drug use continued. Use of cannabis, nonmedical barbiturates, and stimulants declined significantly. No drug showed an increase in use since 1985. The reductions in use of cannabis since 1977 and 1979 are very striking; in 1987 only about half as many students reported using cannabis. A minority of students used crack or smokeless tobacco, but many

drank low-alcohol beverages. There was no overall trend in cocaine use.

#### Implications

The results of these surveys, which are circulated to all school boards in Ontario and to all schools that participate, are of interest to professionals in the field, health planners, and the general public. The results contribute to a better understanding of patterns of drug use and provide a basis upon which to design prevention and intervention strategies. There are plans to continue these biennial surveys.



R.G. Smart

#### Selected Publications

- Smart, R.G. "Solvent Use in North America: Aspects of Epidemiology, Prevention and Treatment." *Journal of Psychoactive Drugs* 1986; 18(2): 87-96.
- Smart, R.G. and E.M. Adlaf, *Alcohol and Other Drug Use Among Ontario Students in 1987 and Trends Since 1977*. Toronto: Addiction Research Foundation, 1987.

•Smart, R.G. and E.M. Adlaf. "Patterns of Drug Use among Adolescents: The Past Decade." *Social Science and Medicine* 1986; 23: 717-719.

#### Prevention Studies (Social and Biological Studies Division)

**Investigators:** R.G. Smart with E.M. Adlaf

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### Alcohol and Drug Use Among Ontario Adults

These regular surveys of the adult (18 years and over) population in Ontario, which began in 1977, complement the student surveys described previously. As with the student surveys, they provide the information necessary to inform researchers and decision makers of the current status of drug use and associated problems.

#### Research

These surveys enquire about the

prevalence and frequency of the use of alcohol, cannabis, cocaine, tranquilizers, stimulants and sleeping pills. This is the only Canadian study which has trend data on cocaine use and the only survey featuring data on crack use in the general population. The data analysis from this survey also features trend analyses based on earlier surveys.

The 1987 survey found increases in the use of cocaine, but not alcohol, sleeping pills, tranquilizers or stimulants. In addition, cannabis use declined significantly among young males. Few recent changes in annual prevalence of sleeping pills, stimulants or tranquilizers were noted. Although there was no overall change in the percentage reporting the use of cannabis, there was a significant decline among those aged 18-29 years, especially males. Finally, the lifetime prevalence of cocaine use increased from 3.3 per cent in 1984 to 6.1 per cent in 1987, although annual prevalence remained stable at the 2 per cent level. Less than 1 per cent of the sample reported the use of cocaine in the form of crack.

#### Implications

Results from these surveys contribute to a better understanding of drug use in Ontario and provide a basis upon which to design prevention and intervention strategies. It is expected that these surveys will continue for a long time, with data collection every two or three years.

#### Selected Publications

- Smart, R.G. "Cocaine Use and Problems in North America." *Canadian Journal of Criminology* 1986; 28(2): 109-128.
- Smart, R.G. and E.M. Adlaf. *Alcohol and Drug Use among Ontario Adults 1977-1987*. Toronto: Addiction Research Foundation, 1987.

#### Prevention Studies (Social and Biological Studies Division)

**Investigators:** R.G. Smart and E.M. Adlaf

**3****Statistics on Alcohol and Drug Use**

ARF has an ongoing need to develop and maintain a statistical library and to compile statistical data on all aspects of alcohol and psychoactive drugs, including their health, social, economic and legal implications. The Statistical Research Program, along with the Statistical Information Service Program (see Research Entry #123) was initiated by the Foundation in 1978 to meet the demand for promptly available statistical information on alcohol and drugs.

**Research**

This program utilizes available documentary sources and data generated by special surveys and reporting systems to present statistical data in usable form. The results of periodic compilations are reported in two volumes entitled *Statistics on Alcohol and Drug Use in Canada and Other Countries* (M. Adrian, ed.). These volumes, which are published by the Foundation, provide the reader with a broad overview of the nature, extent and consequences of the uses of alcohol in Canada, and in Ontario in particular, and present a brief overview of international trends.

Data included in the reports come from a variety of sources. These include surveys commissioned by the Foundation and other agencies such as the federal government, and administrative data bases maintained by a variety of organizations such as the Ontario Hospital Medical Records Institute, the Vital Statistics Registrar, the Coroner's Office and the Liquor Control Board. Municipal, provincial, national and international statistical

bureaus such as Statistics Canada, the World Health Organization and the United Nations Commission on Narcotic Drugs are utilized, as are commercial data bases such as CANSIM. The Statistical Research Program will undertake special studies in areas where there is a paucity of data both in terms of substantive areas (e.g., prescription drug use, economic studies) or statistical methods.

**Implications**

Access to a valid data base is important for policymakers, program planners, administrators, educators and others in the addictions field for monitoring, forecasting, and assessing the impact of responses to the problems of concern. This information is also used to plan treatment and prevention programs on a systematic basis.



M. Adrian

**Selected Publications**

- Adrian, M.(compiler). *Statistics on Alcohol and Drug Use in Canada and Other Countries: Data available by 1988: Volume I – Statistics on Alcohol Use, Volume II – Statistics on Drug Use.* Toronto: Addiction Research Foundation, forthcoming.

•Adrian, M. "Why Semilogarithmic Charts are Not in Current Use: Comment on Schmid (1986)." *The American Statistician* 1987; 41(2): 162.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Adrian, with P. Jull and R. Williams

*Statistics on Alcohol and Drug Use Program* and the *Statistical Information Service* (see Research Entries #3 and #123 respectively). These are the first such studies undertaken in Canada.

These studies allow the determination of the basic background level of drug use in the general population, against which drug abuse (misuse of legal drugs and use of illegal drugs) occurs. This is similar to determining the background level of alcohol use which was eventually related to the number of alcohol abusers (alcoholics) by Sully Ledermann 30 years ago in France, and applied in Ontario by R.E. Popham and W. Schmidt and others 20 years ago. The eventual establishment of such a relationship in the area of drug abuse may be a useful adjunct to the development of improved targeted drug abuse prevention and treatment programs, as has been done in the alcohol field.

**Research**

Activities under this program include the development of statistical indicators of the use of legal psychoactive drugs. A variety of data are used, including surveys of the general population, surveys of prescribers, dispensers, manufacturers and retailers, third party insurance payments, estimated requirements of drug quantities according to the United Nations International Narcotics Control Board, etc. One of the more useful sources of data identified recently is produced by International Marketing Services (IMS) based on audits of monthly purchase invoices of drug stores and hospital pharmacies; these data are primarily used by drug companies to identify market share of specific drugs they manufacture.

**4****Statistics on the Use of Legal Psychoactive Drugs**

This program is intended to provide an overview of the nature and extent of legal psychoactive drug use in Ontario and in Canada. It is an offshoot of the

The Foundation is using this data to provide estimates of drug use of specific (generic) substances at specified drug potencies (pill equivalents), and in terms of the Defined Daily Dose (DDD). The objective is to determine trends in drug use, to compare Canadian usage to levels of use in other countries, to identify drugs having increased use in order to determine if this may be linked to abuse, and to determine appropriateness of prescribing.

#### Implications

Preliminary results of this work have been used in university pharmacologic drug education courses for both medical and pharmacy students. In addition, some results of this line of research have been used by health professionals in the preparation of briefs to the provincial and federal governments with regard to proposed drug legislation. Future directions include a special study of anxiolytics and updating of trends to 1987, depending on funding.

#### Selected Publications

- Busto, U., P. Isaac and M. Adrian. "Changing Patterns of Benzodiazepine Use in Canada: 1978-1984." [Abstract] *Clinical Pharmacology and Therapeutics* 1986; 39: 184.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with Biomedical Research (Clinical Institute Division)  
**Investigators:** M. Adrian, with A. Ali, U. Busto, P. Isaac, K. Lanctot and J.E. Peachey

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#### Drug Utilization

This program is monitoring patterns of psychoactive drug use in Canada to explore the correlation between use and abuse of such drugs. The objective is to identify areas of high drug consumption and possible health

problems associated with use.

The two principal investigators were members of a task force on developing a national drug-monitoring network, reporting to the Federal-Provincial Sub-Committee on Alcohol and Drugs in 1984. This research program is a response to a need for data on psychotropic drug use. These are the first studies of this type undertaken in Canada.

#### Research

Patterns of psychoactive drug use at the provincial and federal levels are being ordered to determine changes in psychoactive drug utilization, and to identify at-risk populations. The studies are based on wholesale figures that are converted to international units (Defined Daily Dose [DDD]/1000 inhab/day).

Results show an increase in the use of psychotropic drugs in Canada. Increase in the use of benzodiazepines (especially rapidly eliminated benzodiazepines) is primarily responsible for this overall increase. Use of antidepressants is also increasing, but represents less than 10 per cent of overall use. Barbiturate use has declined.

#### Implications

The data on drug utilization allow abuse data to be interpreted in the context of use and, therefore, may help to predict the abuse liability of different drugs. Patterns of psychoactive drug use over the years can be monitored and areas where high consumption occurs can be identified. Specific target maneuvers can then be directed to reduce psychoactive drug use.

Monitoring of trends of use and abuse will continue, as well as validation of data on use and abuse with other related studies. Changes in patterns of use will also be correlated with changes in patterns of abuse.



U. Busto

**Biomedical Research (Clinical Institute Division)**, in collaboration with Prevention Studies (Social and Biological Studies Division)  
**Investigators:** U. Busto and M. Adrian, with P. Isaac and K. Lanctot

6

#### Public Drinking Studies

Drinking in public settings constitutes a major portion of total alcohol consumption and contributes disproportionately to particular problems such as impaired driving. This research program addresses gaps in our knowledge concerning the epidemiology of alcohol problems.

In addition, situational determinants of heavy drinking and drinking problems are an important aspect of drinking behaviour. This research program explores the efficacy of regulatory mechanisms and programs aimed at preventing problems stemming from public drinking occasions.

#### Research

Two lines of research are currently active in this program:

1. The Epidemiology of Public Drinking: A representative sample of 200 licensed establishments in Toronto was studied in 1985-86 by teams of observers who collected data on the physical environment, characteristics of patrons and behaviour of staff. The data from this study is currently being analyzed.
2. Provincial Survey Regarding Tavern-going: A series of questions was commissioned from the Gallup omnibus survey of Ontario in November, 1987, concerning drinking in various social settings. The data are being analyzed to provide an

epidemiological mapping of drinking and an analysis of correlates of public drinking.

Preliminary results indicate that males, young persons, high-income and well-educated respondents consume a relatively high proportion of their total drinks in bars and taverns; females, older persons, low-income and less well-educated respondents do more of their drinking at home.

Data from the observational study also indicate that patrons in licensed establishments are frequently served to intoxication, and the overservice of alcohol often leads to incidents of aggressive behaviour. Given the import of situational factors in drinking behaviour, these findings are potentially significant to prevention programming and research. Data analysis from both studies is continuing. Preparation of research reports will be concluded in 1989.

### Implications

As a result of the recent report of the Ontario Advisory Committee on Liquor Regulation, it is expected that there will be major changes in the system of licensing and regulations concerning the sale and service of alcohol. This research might therefore be useful baseline data for future evaluation studies on the impact of changes in alcohol regulations in licensed establishments.

### Selected Publications

- Douglas, R.R., K. Moffat, R. Caverson, E. Single and M. Thomson. "Drinking Practices and Some Implications to Managing Alcohol in Municipal Recreational Facilities and Parks." *Recreation Canada* 1986; 44(2): 32-39.
- Single, E. "The Impact of Serving Practices on Drinking Behaviour." In *Prevention: Alcohol and the Environment. Papers and Reports from a Symposium held in Toronto, Canada, March 18-19, 1985*, eds. Giesbrecht, N. and A.E. Cox. Toronto: Addiction Research Foundation, 1986; 83-97

- Single, E. "The Control of Public Drinking: The Impact of the Environment on Alcohol Problems." In *Control Issues in Alcohol Abuse Prevention: Strategies for State and Communities; Advances in Substance Abuse*, ed. Holder, H. Greenwich, Connecticut: Jai Press Inc., 1987; Suppl. 1: 219-232.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Programs Evaluation Centre  
**Investigators:** E. Single, with D. McKenzie and J. Evans

## 7

### Alcohol Use, Drug Use and Health Among Seniors

There is a lack of both knowledge and data on alcohol use, drug use and health among older adults in Ontario, despite their growing numbers. A newly initiated survey will attempt to examine the nature and scope of alcohol and drug use in the population. Data from the study of Ontario adults (see Research Entry #2) have been analyzed to provide background information relevant to this study.

### Research

The study surveyed 349 adults aged 60 years and over who reside in seniors' apartment buildings in Metropolitan Toronto. The prevalence, frequency and pattern of alcohol and other drug use were examined. Additionally, in order to examine their association with alcohol and other drug use, several relevant measures of physical and psychological health were collected.

The data on seniors in the adult study indicated that the major drugs used were alcohol and sleeping pills. Daily alcohol use was more common among older males than among younger males.

### Implications

The results of this survey will provide not only important epidemiological information, but also data for better prevention and intervention programming. Future work will focus on a detailed analysis of the data from the study of seniors in apartments.

### Grants

This work is supported by a grant from the National Health Research Development Program (NHRDP), Health and Welfare Canada.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.G. Smart and E.M. Adlaf

## 8

### A Study of Drug Use in Detoxification Centres

Ontario currently has 24 nonmedical detoxification centres designed for people intoxicated from excessive alcohol use. It is also apparent, however, that some clients of detox centres use drugs other than alcohol. This is a concern, given the mandate of detox centres and the training given to staff. A group of Toronto-area detox centre directors approached the Foundation to ask if a study designed to determine the prevalence and significance of drug use could be conducted. A pilot study conducted at the Foundation's own detox centre confirmed that drug use other than alcohol was quite common among clients of this centre.

At the request of the Ministry of Health, a proposal for a province-wide survey of admissions to other detox centres was developed and implemented. The aim is to determine the extent of use of drugs other than alcohol among detox admissions. The implications of drug

use behaviours in the detox centres are also being considered in this study.

### **Research**

Urine samples have been collected from over 600 people admitted to six detox centres; they were selected at random from the population of centres and stratified by region and gender of clients served. The number of admissions sampled from each centre was in proportion to the total number of admissions per year. Basic sociodemographic characteristics of all admissions during the study period were also recorded. Staff observations of all those giving or refusing to give urine samples have been collected on standard forms.

Preliminary analyses indicate that, overall, the pattern of the use of drugs other than alcohol is similar to that found in the Toronto pilot study. Almost 50 per cent of urine samples contained at least one drug other than alcohol. Benzodiazepines were the most commonly detected drug, and were found in 34 per cent of all samples. Further analyses are under way and a final report will be available in 1989.

### **Implications**

The results of this study need to be considered when reviewing the mandate of detox centres. However, it appears that detox centres are able to manage drug-using clients quite well and no radical changes to their basic operations are indicated. Still, it is important to ensure that staff of detox centres are fully aware of the kinds of drugs that their clients use and be able to recognize signs of complications arising from the use of these drugs. Drug users may also require special counselling and referral.

### **Selected Publications**

- Ogborne, A.C. and B.M. Kapur. "Drug Use Among a Sample of Males Admitted to an Alcohol Detoxification Center." *Alcoholism: Clinical and Experimental Research* 1987; 11(2): 183-185.

### **Grants**

The work in this program is supported by the Ontario Ministry of Health.

**Community Programs Evaluation Centre**, in collaboration with Clinical Laboratories (Clinical Institute Division)

**Investigators:** A.C. Ogborne and B.M. Kapur

**9**

### **Family Composition and Drinking Patterns**

A number of studies have reported a relationship between drinking levels and marital divorce or separation, but there is little research that looks at the sequence of events which characterizes this relationship. It is important to know whether or not changes in marital status lead to changes in drinking patterns and what the mechanisms are, or whether people who leave marriages already have drinking problems. This information would suggest appropriate strategies for prevention and early identification.

### **Research**

This research program will examine the effects of marital separation or divorce on drinking patterns. Literature on the subject will be reviewed and a questionnaire developed which incorporates measures of current and past drinking patterns and drinking contexts. A small nonrandom sample of married and separated men and women aged 30 - 45 will be interviewed. It is anticipated that analysis of the data will be complete by April, 1989.

### **Implications**

If the preliminary analyses show

significant changes in patterns of drinking and socializing, or in drinking and measures of personal distress among those with changes in marital status compared to those who stay married, a larger study incorporating the findings of the present study will be carried out.



R.G. Ferrence

### **Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Ferrence

**10**

### **Prevalence and Correlates of Drug Use Among Health Professionals**

It is commonly stated that physicians and other health professionals who have access to drugs in their work are particularly likely to develop drug problems themselves. In fact, it has been said that such problems are an occupational hazard for these professions. These assertions have been made in the absence of objective data on the prevalence of drug problems among health professionals. A review of the literature on the prevalence of drug problems among physicians revealed that the proportion of physicians who have such problems is unknown.

### **Research**

One thousand physicians in practice in Ontario were asked whether they had ever been treated for problems with alcohol and other drugs. It was found that the proportion of Ontario physicians who have been treated (1.2 per cent) is similar to that found in population studies. This finding is

significant, especially in the light of widespread statements that physicians are particularly likely to suffer from drug problems. It is not known whether access to drugs in the workplace affects patterns of drug use or choice of drug. It seems not to influence the overall level of problems with all drugs, including alcohol.

### **Implications**

Until recently, there had been little systematic research on health professionals who have problems with alcohol and other drugs. This line of research has shed light on one of the problems of the field: whether physicians are more likely than others to suffer from drug problems. A more detailed study of the prevalence of drug use and drug problems (including alcohol) among physicians and other health professionals is clearly needed, with special attention to the role of access to drugs in the pattern of use.

#### **Selected Publications**

- Brewster, J.M. "Prevalence of Alcohol and Other Drug Problems among Physicians." *Journal of the American Medical Association* 1986; 255(14): 1913-1920. Reprinted as "Alcohol – en Andere Drugproblemen Onder Artsen." *Journal of the American Medical Association* (Netherlands edition) 1986; 4: 125-132.

**Biomedical Research (Clinical Institute Division)**

**Investigators:** J.M. Brewster with F.B. Glaser

## **11**

### **Personal and Professional Characteristics of Physicians Who Have Problems with Alcohol and Other Drugs**

Problems with alcohol and other drugs among health professionals have become a focus of increasing interest. In order for prevention and treatment programs to be most effective, know-

ledge is needed about the personal and professional etiology of these problems. This unique population may have special needs, but there has been little research in this area.

The Doctors on Chemicals (DOC) program was formed in 1977, under the leadership of the College of Physicians and Surgeons of Ontario, to provide assistance to physicians who have problems with alcohol and other drugs. In collaboration with this program, a group of physicians who had these problems was comprehensively assessed in the Assessment Unit of the ARF Clinical Institute before being referred for treatment. In extensive analysis of the data, these physicians were compared with other practising Ontario physicians and with other Clinical Institute patients. The DOC physicians were distinguished from Ontario physicians by being more likely to be in their middle years, divorced or separated, and in solo practice. On many measures, the DOC physicians closely resembled other Clinical Institute patients who were nonmedical professionals and business executives; these three groups differed from other nonprofessional Clinical Institute patients. These analyses led to an extensive study of the personalities of practising Ontario physicians.

### **Research**

The Ontario physician personality study has provided valuable baseline data that will be used in the study of physicians who have problems with alcohol and other drugs. Comparisons were made between the DOC physicians and the normative data. Those with alcohol and other drug problems scored significantly higher than all Ontario physicians on several scales of the Basic Personality

Inventory, particularly those measuring depression, anxiety, social introversion and impulse expression. Further analyses of the personality data are being carried out.

### **Implications**

These studies promise to elucidate the distinguishing characteristics of physicians who have problems with alcohol and other drugs and point the way to further studies of the interaction of personal characteristics with social and professional factors in the etiology of drug problems. This understanding will be useful in the prevention of drug problems in this population, as well as in determining which treatment methods are most likely to be effective. It will also indicate which factors may be important in distinguishing different populations of drug users. The etiology and optimal treatment of drug problems is likely to differ among populations.

#### **Selected Publications**

- Glaser, F.B., J.M. Brewster and B.V. Sisson. "Alcohol and Drug Problems in Ontario Physicians: I. Characteristics of the Physician Sample." *Canadian Family Physician* 1986; 32: 993-999.

**Biomedical Research (Clinical Institute Division)**

**Investigators:** J.M. Brewster with F.B. Glaser

## **12**

### **High-risk Drinking-driving Groups and Situations**

Animal research suggests that alcohol use prior to trauma augments injury severity and inhibits recovery. The few studies that have been done with humans show mixed results. In addition, very little information is available on the psychosocial

characteristics of trauma victims or the long-term consequences of trauma. The Addiction Research Foundation and the Sunnybrook Medical Centre Trauma Unit have embarked on a large-scale study of trauma victims.

### Research

Three interrelated studies investigating various factors of motor vehicle accident (MVA) trauma victims are currently active in this program.

**1. Alcohol as a Factor in Injury and Recovery:** This study is concerned with the incidence and prevalence of alcohol and drugs in MVA trauma patients and the relationship between blood alcohol concentration and injury severity and recovery. Data collection has been ongoing for two and one-half years and the results thus far indicate that about 30 per cent of all MVA trauma patients had positive blood alcohol concentrations.

**2. Psychosocial Characteristics of Trauma Victims:** Since 1987, 90 MVA trauma patients have been interviewed and interviewing will continue into 1989. This study is being carried out in collaboration with Transport Canada, which is studying the psychosocial characteristics of two additional high-risk driver groups (using the same instrument and sample area) — convicted drinking drivers and drivers with bad driving records — plus a comparison group of average drivers. Eventually all three high-risk driver and comparison groups will be compared.

**3. Long-term Consequences of Trauma:** Through a one-year follow-up study, drivers involved in motor vehicle accidents are being interviewed with a special focus on recovery and recidivism. This follow-up interviewing began in July 1987 and will be ongoing for two years.

### Implications

The information obtained from these studies will be used to isolate high-risk drivers and provide information to improve the care of trauma victims, and for countermeasure development.

### Selected Publications

- Vingilis, E., C.B. Liban, B. McLellan and R.Y. McMurtry. "Blood Alcohol Concentrations among Motor Vehicle Accident Trauma Admissions to a Regional Trauma Unit." *Canadian Journal of Public Health* 1988; 79: 392-393.

### Grants

The work in this program is financially supported by Transport Canada, the U.S. National Institute of Alcohol Abuse and Alcoholism (NIAAA), the Sunnybrook Trust Fund and the Ministry of the Attorney General.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with Sociobehavioural Research (Clinical Institute Division), the Sunnybrook Medical Centre and Transport Canada.

**Investigators:** E. Vingilis, with C.B. Liban, B. McLellan, R.Y. McMurtry, B.M. Kapur, H. Blefgen, H. Lei, E.J. Larkin, W. Nelson and M. Macartney-Filgate

## 13

### Drinking and Driving Among Youth

Drinking habits and driving habits are formed during adolescent years. However, little is known about the processes that influence drinking and driving in these age groups, or about the effectiveness of the various countermeasures designed to prevent or reduce the problem.

### Research

The research has two major thrusts: to determine the factors associated with the onset of drinking and driving among youth, and to evaluate the effectiveness of existing educational countermeasures.

**1. As part of the omnibus biennial high school survey, questions are asked of grade 11 and 13 students about driving and drinking-driving practices. Trends for self-reported drinking and**

driving are assessed. Predictors of drinking-driving behaviours are being defined, and the long-term effects of raising the drinking age are being evaluated.

**2. A major review of school-based educational countermeasures has been completed. Although few of these programs have been evaluated, and no indication of the traffic safety impact is available, the results suggest that affective involvement and behaviourally based programs can have at least short-term beneficial effects on knowledge, attitudes and self-reported behaviours.**

### Implications

The results to date indicate that certain behaviours and attitudes are associated with drinking-driving risk among youth, and that certain types of education may help to reduce that risk. This work will provide a basis for understanding the development of drinking and driving, and for developing and targeting effective countermeasures.

### Selected Publications

- Mann, R.E. "Issues in Drink-driving Countermeasures Development." In *Report...The First National Drink-driving Educators Conference*, ed. Ballard, R. Queensland, Australia: Department of Education, 1988; 12.
- Mann, R.E. "Drink-driving Education: North American Experience." In *Report...The First National Drink-driving Educators Conference*, ed. Ballard, R. Queensland, Australia: Department of Education, 1988; 13.
- Mann, R.E., E. Vingilis, G. Leigh, L. Anglin and H. Blefgen. "School-based Programmes for Prevention of Drinking and Driving: Issues and Results." *Accident Analysis and Prevention* 1986; 18: 325-337.
- Vingilis, E., K. DeGenova and E.M. Adlaf. "Drinking-driving Behaviour of Ontario High School Students." *Canadian Journal of Public Health* 1986; 77(3): 196-200.

### Grants

In 1987 this work was supported by the Ontario Ministry of the Attorney General.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** E. Vingilis and R.E. Mann, with I. Anglin, C.B. Liban, K. DeGenova, E.M. Adlaf, G. Leigh and H. Blefgen

**14****Drugs and Driving: High-risk Groups and Situations**

While much is known about the role alcohol plays in road accidents, the impact of other drug use is poorly understood. Laboratory studies of drug-influenced behaviour demonstrate that many drugs impair psychomotor performance, but the extent of the traffic hazard posed by drug users is unknown.

**Research**

The object of this research program is to collect self-reported and official record data on the driving risks presented by clinical samples of problem users of drugs other than alcohol. Two studies based on clinical samples are currently identifying patterns of drug use, sociodemographic factors and personality/clinical factors which are associated with elevated driving risks.

1. Polydrug Abusers Study: This study consists of interviews with individuals who are self-identified problem users of alcohol, cannabinoids, stimulants and/or depressant drugs.

2. Patterns of Drug Use and their Correlates: This study consists of interviews and supplementary data collected from an unselected sample of young drug abusers.

Data collection for both studies began in mid-1988.

**Implications**

The information derived from these studies will aid in the assessment of high-risk drug-using drivers and have important implications for countermeasure development. For example, it will help to determine whether or not specific treatment or deterrence programs are necessary.



R.E. Mann

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with Sociobehavioural Research (Clinical Institute Division)

**Investigators:** R.E. Mann and E. Vingilis, with D.A. Wilkinson, L. Fornazzari, L. Anglin, E.J. Larkin, H. Lei and W. Skinner.

**15****Population and Individual Factors Influencing Accident Risk**

The impact of alcohol on the individual, and thus the risk posed by an individual drinking driver, is determined by factors specific to the person and on more general societal factors. Unfortunately, little information is available on how societal and individual factors interact to control impairment and accident risk. The objective of this research program is to define relevant population, person and situation factors that affect accident risk as measured by epidemiological and laboratory-based measures.

**Research**

1. Person and Situation Factors: In this collaborative study with the University of Waterloo and the Traffic Injury Research Foundation, the impact of a situation factor (reinforcement) and a person factor (self-reported cognitions) on alcohol-induced impairment of psychomotor performance was examined. The amount of impairment observed is related in important ways to both the person and the situation factors. Over a series of drinking sessions, provision of reinforcement for non-impaired performance resulted in the development of tolerance, while certain cate-

gories of cognitions predicted initial impairment and speed of tolerance development.

The results of this study, which is now complete, demonstrated that both person (self-reported cognitions) and situation (reinforcement condition) factors determine the amount of impairment observed.

2. Population Factors: A second project has addressed the issue of the relationship between population levels of impairment (as indexed by per capita consumption of alcohol) and various indices of alcohol-involved traffic fatalities in Ontario. This work has been completed and the results indicate that per capita consumption is a strong correlate of each measure of alcohol-involved fatalities. A literature review on the relationship between per capita consumption and measures of alcohol-involved traffic problems is now being prepared.

**Implications**

Efforts to reduce drinking-driving cannot rely on a single countermeasure. A combination of countermeasures working in the same direction is needed. Knowledge derived from this program will help to determine which drinking-driving countermeasures to use and when to use them. This work also provides a basis for predicting the effectiveness of various drinking-driving policies.

With the completion of these studies, active research in this area has temporarily stopped. However, the possibilities for funding further laboratory research on the interactive determinants of impairment are being considered, and Transport Canada researchers are interested in collaborative work in this area. As well, additional data bases for examining population trends are being sought.

**Selected Publications**

- Mann, R.E. and L. Anglin. "Alcohol Availability, Per Capita Consumption and the Alcohol-crash Problem." In *Drinking and Driving: Advances in Research and Prevention*, eds. Wilson, R.J. and R.E. Mann. New York: Guilford Press, forthcoming.
- Mann, R.E. and L. Anglin. "The Relationship Between Alcohol-related Traffic Fatalities and Per Capita Consumption of Alcohol, Ontario 1957-1983." *Accident Analysis and Prevention*, in press.
- Mann, R.E., D. Beirness, L. Anglin and M. Vogel-Sprott. "Cognitions and Alcohol-influenced Performance: The Impact of Reinforcement Contingencies." *Drug and Alcohol Dependence* 1988; 21: 49-56.
- Mann, R.E., R.G. Smart, E. Vingilis, L. Anglin and D. Duncan. "Alcohol-related Accident Statistics in Ontario Between 1957 and 1984 – Is The Problem Increasing or Decreasing?" In *Alcohol, Drugs and Traffic Safety – T86*, eds. Noordzij, P.C. and R. Roszbach. Amsterdam: Elsevier, 1987; 245-249.
- Vingilis, E. "The Six Myths of Drinking-driving Prevention." *Health Education Research: Theory and Practice* 1987; 2: 145-149.
- Vingilis, E. and R.E. Mann. "Towards an Interactionist Approach to Drinking-driving Behaviour: Implications for Prevention and Research." *Health Education Research: Theory and Practice* 1986; 1: 273-288.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.E. Mann and E. Vingilis, with L. Anglin, R.G. Smart, D. Duncan, D. Beirness and M. Vogel-Sprott

16

**Relationships of Alcohol, Tobacco and Drug Use**

While there is a high correlation between tobacco and alcohol use, relatively little is known about what effect treatment for one substance (e.g., alcohol) has on the consumptive patterns of other substances. Consequently, knowledge of the interaction between consumptive and cessation patterns of different substances is of growing importance in the addictions field.

**Research**

The objective of this new research

program is to determine the interrelationships between the consumptive and cessation patterns of alcohol, tobacco, and other drug types one year before and one year after treatment. The information is gathered via interviews and questionnaires.

The long-term objective is to evaluate whether multiple substance abuse problems (e.g., alcohol and tobacco) can be more effectively treated with concurrent or sequenced treatments.

**Implications**

The information gathered from this research will serve several functions. Clinically, it can increase our understanding of therapeutic processes that may be common to the recovery from the abuse of different substances. Theoretically, it can broaden our understanding of the common process that may underlie the development of multiple substance abuse. It can also provide information on the temporal patterning of recovery from multiple substance abuse problems (e.g., incidence of dual recoveries).

**Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** L.T. Kozlowski, L.C. Sobell and M.B. Sobell

smoking from the analysis can be ill-advised, if not impossible. Other studies have reported a protective effect of moderate drinking on coronary heart disease, but it is not clear whether smoking has been adequately controlled.

**Research**

The work currently involves secondary analysis of mortality and morbidity data to determine the relative risk of the co-occurrence of heavy drinking and heavy smoking. Consumption of small quantities of alcohol appears to be beneficial to health. This study will investigate the possibility that the apparent hazards associated with alcohol abstinence may be explained by smoking patterns.

**Implications**

This work points to the importance of considering smoking habits along with drinking and drug-use behaviour when looking at hazardous outcomes. The findings to date also suggest that treatment programs may need to deal with multiple substance abuse, including tobacco use, rather than focusing on single substances.

**Sociobehavioural Research (Clinical Institute Division) and Prevention Studies (Social and Biological Studies Division)**

**Investigators:** L.T. Kozlowski and R.G. Ferrence

17

**Epidemiological Issues Related to the Use of Tobacco and Alcohol**

Studies that look at alcohol consumption as a risk factor for disease usually make some attempt to control for cigarette smoking. Since most heavy drinkers also smoke heavily, attempting to remove

**18****Sex Differences in Tobacco and Alcohol Use and Related Problems**

In order to develop prevention programs and policies that reduce alcohol- and tobacco-related problems, data on tobacco and alcohol use are needed. This ongoing program currently focuses on sex differences in patterns of tobacco use in Canada and includes variations by age, region and social class. Previous work in this area has been mostly descriptive. The present research uses multivariate techniques to look at relationships among different demographic and socioeconomic indicators in predicting smoking behaviour.

**Research**

Patterns of tobacco use have been analyzed using a number of data sets. A reconstructed cohort study of sex differences in cigarette smoking in Canada was completed recently using data from the 1978-79 Canada Health Survey. Results show major sex differences in historical patterns of cigarette smoking. Smoking among women has lagged 10 to 20 years behind smoking among men, with women starting to smoke later and quitting smoking later, as well. Rates of smoking are now similar in younger cohorts, but older men and women show patterns that reflect these historical trends.

Further analyses involved stratifying the cohorts by region and education to look at socioeconomic and geographic effects of the spread of smoking. Early adoption and cessation are associated with higher socioeconomic status and with residence in areas characterized by

higher socioeconomic status and higher levels of communication. Log linear analyses showed substantial interaction between cohort and education and cohort and sex in both adoption and cessation and in the level of smoking among smokers.

A 1986 Gallup survey on attitudes and behaviour showed that women and men do not differ in the extent to which they report being addicted to cigarettes or in time to the first cigarette in the morning, a measure of physical addiction to nicotine. These findings were combined with repeated cross-sectional data from the *Smoking Habits of Canadians Survey* and the *U.S. Health Interview Survey* to examine sex and age differences in trends for cigarette smoking and cessation over the past two decades. Younger men and women now have similar rates of smoking and cessation; older women have lower rates of smoking cessation than older males. The sex differences in rates of cessation within age groups have not changed since the mid-1960s.

Finally, data from *Canada's Health Promotion Survey*, which includes a major attitudinal component, were used to test hypotheses about variations in rates of smoking by socioeconomic status. These variations are quite substantial and have become important in planning programs and health policy.

**Implications**

Work is continuing in this area, using new data sets that have been made public recently. These include the 1985 *General Social Survey* (Statistics Canada) and the 1986 *Smoking Behavior of Canadians Survey*. Future research in this program may focus on sex differences in drinking patterns, in conjunction with smoking behaviour.

**Selected Publications**

- Ferrence, R.G. "Women and Smoking: What's Happening and What Can be Done About It?" In *Proceedings of the Health and Welfare Canada Workshop on Women and Smoking*, Ottawa, 1988.
- Ferrence, R.G. "Women and Addictions: Who is at risk?" In *Proceedings of the National Symposium on Changing Patterns of Health and Disease in Women*. Health and Welfare Canada and Status of Women, Ottawa, April 1988.
- Ferrence, R.G. "Sex Differences in Cigarette Smoking in Canada, 1900-1978: A Reconstructed Cohort Study." *Canadian Journal of Public Health* 1988; 79: 160-165.
- Ferrence, R.G. *The Diffusion of Cigarette Smoking: An Exploratory Analysis*. PhD Dissertation, University of Western Ontario, London, Ontario, 1988.

**Grants**

The work on socioeconomic status, gender and cigarette smoking is supported by a grant from the MacArthur Foundation, administered through Yale University.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.G. Ferrence with L.T. Kozlowski

**19****Evaluation of So-called Less Hazardous Smoking Practices: Low-yield Cigarettes**

Low-yield cigarettes deliver low levels of tar, nicotine and carbon monoxide in smoking-machine assays. Smokers turn to these cigarettes in hopes of reducing the health risks of smoking. Tar yields to smokers depend, however, on how the smoker smokes. Even the lowest-yield cigarettes can deliver very high yields if the smoker blocks the diluting vents on the filter.

**Research**

The two studies described below make use of self-reports of smoking and of biochemical indicators (CO, cotinine, nicotine) to assess smoking behaviour.

1. Studies on the effects of low-yield cigarettes and smoking fewer cigarettes per day on smoke exposure

are being conducted in collaboration with Labstat Incorporated (the official Canadian laboratory for testing tar and nicotine in cigarettes) and Dr. N. Benowitz, University of California, San Francisco. A colour-matching technique is being used to assess the actual tar and nicotine yields to smokers. Emphasis is also being given to the problem of hole-blocking of filter vents on ultra-low-yield cigarettes.

2. A collaborative project with Labstat is also looking at the effects of informing smokers of their compensatory smoking practices. For example, does motivation to quit go up when smokers are informed that they are oversmoking their low-yield cigarettes?

#### Implications

Many smokers try to cut down by smoking fewer cigarettes per day or by smoking low-yield cigarettes. This research shows that this approach to reducing smoking risk can be dangerously misleading. The work emphasizes that complete cessation of smoking is the likeliest way to reduce the health risks of smoking.

#### Selected Publications

- Kozlowski, L.T. "Less Hazardous Smoking and The Pursuit of Satisfaction." [editorial] *American Journal of Public Health* 1987; 77: 539-541.
- Kozlowski, L.T. "Blocking the Filter Vents of Cigarettes." [letter to the editor] *Journal of the American Medical Association* 1986; 256: 3214.
- Kozlowski, L.T., M.A. Pope and J.E. Lux. "Prevalence of the Misuse of Ultra-low Tar Cigarettes by Blocking Filter Vents." *American Journal of Public Health*, in press.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.T. Kozlowski and R.C. Frecker

20

#### Evaluation of So-called Less Hazardous Smoking Practices: Cigar and Pipe Smokers

Primary pipe/cigar smokers are smokers who have never been cigarette smokers; secondary pipe/cigar smokers are former cigarette smokers who have turned to pipes or cigars, presumably to reduce health risks. Epidemiologists think that this distinction relates to the health risks of smoking these products. They believe that primary smokers do not inhale while secondary smokers do. This program is studying the differences between primary and secondary cigar/pipe smokers.

#### Research

Smokers were asked if they inhale (recorded on a four-point scale, "not at all" to "very much"). The inhalation was confirmed by a breath test for carbon monoxide. Carbon monoxide is not absorbed from smoke if the smoke is not taken into the lungs. The study found that direct questions of inhalation practices give a good indication of smoke exposure.

#### Implications

Secondary smokers who inhale need to be advised of the likely risks of their smoking habit. They may think of their type of smoking as less hazardous. However, if they inhale and smoke several pipes or cigars per day, their health risks are likely to be similar to those of cigarette smokers.

#### Selected Publications

- Herling, S. and L.T. Kozlowski. "The Importance of Direct Questions About Inhalation and Daily Intake in the Evaluation of Pipe and Cigar Smokers." *Preventive Medicine* 1988; 17: 73-78.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.T. Kozlowski and S. Herling

21

#### Illicit Drugs in Canada

A number of disciplines have taken up illicit drug use as a topic of study, and courses are offered in this specialty. Despite a considerable amount of excellent work by Canadian scholars, no source book had ever drawn all this material together.

#### Research

*Illicit Drugs in Canada* is a new book of readings on illicit drug use and distribution in Canada, which brings together published and original work. The selection encompasses works from law, pharmacology, epidemiology, psychology, sociology and criminology that address contemporary issues and concerns about illicit drugs in Canada. Nearly half of the 26 authors whose work is represented here are on the staff of, or have been associated with, the Addiction Research Foundation. Considerable attention is paid to policy analyses and proposals for change that are amenable to Canada's legal system.

This book provides the most current, comprehensive source of readings on illicit drugs in Canada. Since much of the reported research has been conducted in Ontario, the book is of particular interest to students and other target groups in this province.

#### Implications

In addition to serving as a textbook, this collection will be of interest to those involved in drug policy analysis and administration at both the federal and provincial levels.

#### Selected Publications

- Blackwell, J.C. and P.G. Erickson, eds. *Illicit Drugs in Canada: A Risky Business*. Scarborough, Ontario: Nelson Canada, 1988
- Prevention Studies (Social and Biological Studies Division)

**Investigators:** P.G. Erickson with J.C. Blackwell

**22**

## Cocaine Use in the Community

Concern about the potentially serious adverse effects of cocaine is considerable, but little Canadian or Ontario research has been available. Accordingly, a study was undertaken in which 111 cocaine users who were neither in treatment nor prison were interviewed about their practices, beliefs and experiences related to cocaine. The major findings of this study were published in *The Steel Drug: Cocaine In Perspective*, a unique book which combines original research with historical, cultural and epidemiological reviews of the cocaine literature.

### Research

The objective of this research program is to study the use of cocaine and associated problems in the community and to provide a balanced perspective on the risks of cocaine to the people of Ontario, especially those in more vulnerable sub-groups. Using the same data base on the 111 cocaine users, two studies are currently active:

1. Sex Differences in Cocaine Use: A number of accounts in the popular media have identified women, particularly career women, as a high-risk group for the development of cocaine dependence. These claims were based on anecdotal accounts, not objectively derived evidence. An analysis of the original data base with respect to sex differences showed few differences between men and women in frequency or patterns of cocaine use. Subjective benefits of cocaine varied somewhat between the two groups but perceptions of risk to health did not. Differences in acute effects and chronic reactions were

also found to be minimal. These data provided little support for the identification of women as a specific high-risk group for cocaine problems.

Regarding the subjective benefits of cocaine, women more often than men reported that it made them feel sociable and confident. Men, on the other hand, were more likely than women to identify physical energy and the sense of a controlled high as the things they liked most about cocaine.

2. Deterring Cocaine Use: The original data on the 111 cocaine users were also analyzed for factors related to a projected measure of continued cocaine use. The results of the regression analysis showed that those who intended to continue cocaine use were more likely than declared quitters to have purchased cocaine, more likely to associate minimal risks with regular cocaine use and less likely to have experienced a craving for cocaine. Legal threats were perceived to be remote.

### Implications

This work suggests that concerns with the prevention of cocaine problems might more realistically focus on the more salient health risks. Also, prevention efforts might be related to those at risk in the later stages of drug use. A proposal has been developed for a longitudinal study of cocaine and other illicit drug users. This will emphasize developmental patterns in cocaine use and the consequences associated with different stages and levels of use. The relative influence of legal, health and informal social controls will be assessed in their relation to initiating, continuing or ceasing cocaine use. The data set on 111 cocaine users will be maintained with a view to further analysis.



### Selected Publications

- Adlaf, E.M. "Self-reported Cocaine Reactions among Social-recreational Users: A Factor Analytic Study." *Drug and Alcohol Dependence* 1986; 18: 203-212.
- Erickson, P.G., E.M. Adlaf, G.F. Murray and R.G. Smart. *The Steel Drug: Cocaine In Perspective*. Lexington, Massachusetts: D.C. Heath, 1987.
- Murray, G.F. "Cocaine Use in the Era of Social Reform: The Natural History of a Social Problem in Canada, 1880-1911." *Canadian Journal of Law and Society* 1987; 2: 29-43.

### Grants

The proposal for a longitudinal study of cocaine users has received approval from the National Health Research Development Program (NHRDP). This project will continue from 1988 to 1993.

### Prevention Studies (Social and Biological Studies Division)

**Investigators:** P.G. Erickson, with E.M. Adlaf, G.F. Murray, R.G. Smart and V.A. Watson

**23**

## Lethal Dose Studies of Cocaine

Cocaine use has increased rapidly in the U.S., and there are some indicators of rapid increase in Canada, especially in Ontario and British Columbia. Some laboratory and clinical studies are relevant to the issue of the lethal dose for cocaine, but no review has been made that attempts to establish the lethal dose, based on all available research.

### Research

This study reviewed and analyzed the relevant laboratory and forensic studies of deaths related to cocaine use. The review established that the range of post mortem cocaine blood levels is very great for humans. Some users have died with blood levels less than that found after usual street doses. Death from cocaine is often rapid and unpredictable, and no dose can be seen as safe.

**Implications**

This review is important because it identifies cocaine as an extremely dangerous drug. Further reviews will be made in coming years as more research is done on cocaine.

**Selected Publications**

- Smart, R.G. and L. Anglin. "Do We Know the Lethal Dose of Cocaine?" [Letter to the editor] *Journal of Forensic Sciences* 1987; 32: 303-312.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.G. Smart with L. Anglin

24

**The Adverse Effects of Alcohol Use: Focus on Unemployment**

Numerous studies have shown that the psychological, social and economic impact of unemployment can be devastating, but few studies have considered the influence of unemployment upon alcohol use. Those investigators who have considered this problem (such as Smart and Giesbrecht) have suggested that the relationship between alcohol use and unemployment is complex, with some users increasing and some decreasing their consumption after lay-off or dismissal. This research project sets out to unravel the relationships between alcohol use, unemployment and other social, economic and psychological factors.

**Research**

The study was conducted by questionnaire under the auspices of the Peel Region Social Planning Council and the United Auto Workers in Brampton, Ontario, among a sample of 200 individuals who were seeking assistance through Help Centres for

the unemployed in that area. The results show that while many users of alcohol reduce their consumption after unemployment, a significant minority increase it. In effect, those who increase their consumption do so at the expense of other goods and commodities, since they are spending a larger proportion of their reduced income on alcohol.

**Implications**

Unemployment is a cyclic phenomenon, each wave of which leaves behind a vast array of social and psychological costs to individuals, their families and their communities. Unemployment-induced increases in alcohol consumption are among these costs and the effects upon society are long-term and far-reaching. This study recommends support services for the unemployed which may help reduce the chance that stressful episodes of joblessness will bring about lasting damage in the area of alcohol abuse.



M. Shain

**Selected Publications**

- Groeneveld, J. "Research on Unemployment and Drinking as a Basis for Intervention Planning." In *Prevention: Alcohol and the Environment. Papers and reports from a Symposium held in Toronto, Canada, March 18-19, 1985*, eds. Giesbrecht, N. and A.E. Cox. Toronto: Addiction Research Foundation, 1986: 132-142.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Shain with J. Groeneveld

25

**The Adverse Effects of Alcohol Use: Focus on Battered Women**

Battered women are a neglected risk group with regard to their use of alcohol and drugs. It is estimated that about 10 per cent of women living with spouses or partners experience violence at some point in their relationships, and this exacts a high price on physical, mental and familial health.

**Research**

This work investigates the practical and symbolic meaning of alcohol and drug use by battered women.

Approximately 50 shelters and transition houses were involved in the first part of this program. In the second phase, 2000 women living with spouses or partners in households throughout the province were interviewed to determine the prevalence of physical abuse and its relationship to alcohol and drug use.

The general health needs and risks of this population are also being studied so that strategies which will be relevant to abused women can be developed at both preventive and remedial levels. The household survey was carried out by Gallup Ontario.

**Implications**

These studies of the antecedents and correlates of alcohol and drug use among battered women increase our knowledge of drug and alcohol use among the victims of family violence. Intervention strategies aimed at alleviating the problems experienced by this high-risk population will be derived from this work.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Shain with J. Groeneveld

**26****Liver Cirrhosis Epidemiology**

Alcohol consumption has decreased slightly in Ontario in the past 10 years. Studies based on Ontario and national data show that alcohol-related problems, such as liver cirrhosis, alcohol-related poisonings and alcohol-related accidents have decreased far more than expected, given the slight drop in consumption.

**Research**

Studies are being made of the reductions in liver cirrhosis death rates in various age, sex and geographic groups to determine whether the reductions are broadly distributed and whether etiological clues are suggested. Thus far, studies of liver cirrhosis in Ontario have shown that reductions were associated with increases in the number of alcoholics treated in different geographic areas. Also, the reductions were shown to have occurred in several provinces in both sexes and most age groups. Some international data also show that reductions in liver cirrhosis have occurred in many other countries and are not closely related to changes in per capita alcohol consumption.

**Implications**

Further studies of liver cirrhosis epidemiology will examine how self-help treatments, such as Alcoholics Anonymous, relate to reductions in cirrhosis. Results from this study will make it possible to plan further interventions that can reduce liver cirrhosis deaths.

**Selected Publications**

- Mann, R.E., R.G. Smart and L. Anglin. "Reduction in Liver Cirrhosis Mortality and Morbidity in Canada: Demographic Differences and Possible Explanations." *Alcoholism: Clinical and Experimental Research* 1988; 12: 290-297.

- Smart, R.G. "Changes in Alcohol Problems as a Result of Changing Alcohol Consumption: A Natural Experiment." *Drug and Alcohol Dependence* 1987; 19(1): 91-97.
- Smart, R.G. "Socio-economic, Lifestyle and Availability Factors in the Stabilization of Alcohol Consumption in Canada." *Canadian Journal of Public Health* 1987; 78: 176-180.
- Smart, R.G. "Recent International Reductions and Increases in Liver Cirrhosis Deaths." *Alcoholism: Clinical and Experimental Research* 1988; 12: 239-242.
- Smart, R.G. and R.E. Mann. "Large Decreases in Alcohol-related Problems Following a Slight Reduction in Alcohol Consumption in Ontario 1975-83." *British Journal of Addiction* 1987; 82: 285-291.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.G. Smart and M. Shain

emergency service patients. This program reviews existing and alternative systems of recording and interpreting information on alcohol- and drug-related casualties. The objective is to improve methods for assessing the role of alcohol and other drugs in casualties, and to examine the situations and events pertaining to alcohol/drug-related casualties.

**Research**

This program is assessing the current state of knowledge about the prevalence of alcohol/drug-related casualties and their etiology, in order to develop specific research strategies and proposals.

A national study of accidents, poisonings and violence in conjunction with alcohol and other drug consumption in Canada is being conducted. This feasibility study is assessing aggregate data on alcohol/drugs and casualties, particularly via mortality and morbidity systems. Several national associations involved in casualty management have been consulted and, after pretesting, a survey questionnaire was distributed to emergency services across Canada.

In addition to publication of the *Proceedings of the Symposium on Alcohol-related Casualties*, another sub-project has involved the preparation of a collection of papers entitled *Drinking and Casualties: Accidents, Poisonings and Violence in an International Perspective*. This collection of 22 original papers and three reprinted papers is in press.

**Implications**

An important application of this work pertains to the role of alcohol and/or other drugs in the development of appropriate policies and programs at various levels: institutional (e.g., hospitals, medical training), societal

**27****Alcohol, Other Drugs and Casualties**

This program draws from the work presented at an International Symposium on Alcohol-related Casualties held in Toronto in August, 1985. The Symposium involved approximately 50 participants from over 20 countries and included reviews of literature (organized by global regions), papers on causality and methodology, country reports based on aggregate data available, and presentations of special studies based on primary data. Workshops provided a stimulus for planning studies on emergency service patients, a repeated sampling approach where useful aggregated data are scarce, and a project on the impacts of major changes in the availability of alcohol (see Research Entry #44).

There is a need to follow up this work in order to assess the extent and type of aggregate data available on casualties in Canada and develop plans for a prospective study based on

(e.g., data systems), and community (e.g., awareness and prevention initiatives). Future work in connection with the *National Study of Accidents, Poisonings and Violence* includes a study based on a sample of emergency service clientele.

#### **Selected Publications**

- Giesbrecht, N. and H. Fisher, eds. *Alcohol-related Casualties. Proceedings of an International Symposium, Toronto, Canada, August 12-16, 1985.* Toronto: Addiction Research Foundation, 1987.
- Giesbrecht, N., R. Gonzalez, M. Grant, E. Österberg, R. Room, I. Rootman and L. Towle, eds. *Drinking and Casualties: Accidents, Poisonings and Violence in an International Perspective.* London: Routledge, 1989.

#### **Grants**

Aspects of this program are supported by grants from the National Health Research Development Program (NHRDP), Health and Welfare Canada and Supply and Services Canada.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** N. Giesbrecht, with B.M. Kapur, V. McGowan, J. Barker, P. Pranovi and L. Wood

28

### **Drinking and Self-destructive Behaviour**

This longstanding line of research focuses on the role of drinking patterns in relation to attempted suicide. The work is based partially on a large data set of attempted suicide cases collected in London, Ontario, between 1969 and 1971.

#### **Research**

Current work involves an investigation of the role of alcohol in the social context of the suicide attempt, the physical condition of the patient and the institutional response to the attempt. Preliminary analyses suggest that drinkers differ from nondrinkers in these aspects of suicide attempts.

#### **Implications**

These analyses will be extended using

multivariate techniques to examine in greater detail the role of alcohol in suicide attempts. This approach will permit a more precise estimate of the effects of different factors and the interaction between factors.

#### **Selected Publications**

- Ferrence, R.G. "Sex Differences in Alcohol-related Casualties: The Case of Self-destructive Behaviour." In *Drinking and Casualties: Accidents, Poisonings and Violence in an International Perspective*, eds. Giesbrecht, N., R. Gonzalez, M. Grant, E. Österberg, R. Room, I. Rootman and L. Towle. London: Routledge, 1989.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Ferrence

29

### **Longitudinal Etiological Factors of Alcohol and Drug Use**

Cross-sectional research designs are the most commonly employed technique to examine correlates of substance use and abuse. This methodology, however, cannot fully address the causal nature of temporally ordered factors or the dynamics of individual change. Longitudinal (panel) designs are necessary for this purpose. Despite this, few panel studies have been conducted in Canada.

#### **Research**

The objective of this program is to develop and conduct a prospective study of substance use and associated problems. From a random-digit-dialing telephone survey, about 1000 youths aged 12, 15 and 18 years will be asked to participate in a panel study that is expected to span some 20 years.

Since the approach is interdisciplinary, the theoretical domains of interest are broad, including etiological factors of

substance use and abuse, treatment issues, social policy, drinking and driving behaviours, personality, psychosocial and health-related factors, and biochemical measures and markers. The study will examine the full spectrum of substance use, from medically prescribed use to proscribed recreational use. An extensive literature review of longitudinal substance studies and project planning has begun.

#### **Implications**

The information from such a study will help reveal the causal dynamics that predict stages of alcohol and other drug use.



E.N. Adlar

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Programs Evaluation Centre and Biomedical Research (Clinical Institute Division)

**Investigators:** E.M. Adlar and R.G. Smart, with L. Glikson and B.M. Kapur

30

### **Social Costs of Drug Problems**

The objective of this program is to estimate the economic burden on society due to the use of drugs, including excessive use of alcohol. The program is a continuation of social costs estimates undertaken previously within the *Statistics on Alcohol and Drug Use* research program (see Research Entry #3). The first estimate of the economic costs to society of alcohol and drug problems was prepared for the *Statistical Supplement to the Annual Report 1979-1980* (M. Adrian, ed.). These early figures related to the social costs resulting from excess morbidity due to

alcohol-related problems, reduced labour productivity costs and law enforcement costs. The concept of social costs has since been expanded to include social welfare costs, and costs due to fires and automobile accidents.

### **Research**

Three phases characterize the program:

1. In phase one, social costs for Ontario, the other provinces and territories, and the nation due to alcohol (including excess health care costs, law enforcement costs, reduced labour productivity and social welfare costs) were updated for the year 1984. These figures were estimated using mortality statistics and preliminary government expenditures for 1984. This phase is now complete. Alcohol-related costs in 1984 (based on mortality) were estimated at \$1.9 billion for Ontario and \$6.4 billion for Canada.

2. Phase two consists of determining excess morbidity due to alcohol. This is done by looking at Ontario hospital morbidity data in relationship to morbidity rates for the Canadian population, taking into account its age and sex structure, using age-sex standardization in the indirect method for the population aged 15 and over. Preliminary results based on the 1978-79 benchmark year seem to indicate that the excess morbidity figure is comparable to excess mortality. This would validate the method and the reliability of figures achieved, and allow its application to estimating social costs due to other, nonalcoholic drug use for phase three. Data quality checks are under way.

3. In phase three, excess morbidity in patients treated for problems associated with the use of illegal drugs and the misuse of legal

psychoactive prescription drugs will be determined in order to estimate costs as in phase one. This phase will be completed in 1988-89.

### **Implications**

Estimates derived by this study provide a useful measure of the economic burden imposed on society by people who abuse drugs. This kind of research allows for rational decision making, in view of the limited resources available for social policy-making.

#### **Selected Publications**

- Adrian, M. "Social Costs of Alcohol." *Canadian Journal of Public Health*, in press.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Adrian, with V. Shehadeh and S.J. Barry

## **31**

### **Economic Factors in Alcohol and Drug Use**

This program is intended to integrate the public health and economic perspectives on factors influencing the use of alcohol and drugs and the development of consequent problems. It is an offshoot of the program *Statistics on Alcohol and Drug Use* (see Research Entry #3) and is intended to identify the impact of social and economic forces in the alcohol and drug fields.

### **Research**

The program considers market forces as they apply to alcohol and drugs (considered as market goods), using established economic research principles. Thus far the impact of social and economic forces on alcohol and drug use and the development of alcohol and drug problems have been considered.

Recently, the level of alcohol consumption has been examined taking into account:

- factors relating to purchasers such as income, level of employment and unemployment, type of employment, overall spending patterns
- factors relating to price of goods that influence the demand for domestic vs. imported alcoholic beverages
- external factors (such as advertising) intended to influence consumer spending.

### **Implications**

The results of this program will alert policymakers in the alcohol and drug field to the effects of economic forces on public health problems.

#### **Selected Publications**

- Adrian, M. and B.S. Ferguson. "The Influence of Income on the Consumption of Alcohol in Ontario: A Cross-sectional Study." In *Drugs and Alcohol*, eds. Carmi, A. and S. Schneider. Berlin: Springer-Verlag, 1986; 6: 151-157.

- Adrian, M. and B.S. Ferguson. "Demand for Domestic and Imported Alcohol in Canada." *Journal of Applied Economics* 1987; 19: 531-540.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Adrian with B.S. Ferguson

## **32**

### **Ontario Prevention Study**

The Distribution of Consumption Model proposes that the average level of alcohol consumption in a jurisdiction is positively related to the proportion of heavy consumers and the prevalence of alcohol-related complications, particularly chronic health-related problems. This research program examines the flexibility of the distribution of alcohol consumption via an intervention aimed at drinkers who consume at hazardous levels, to determine whether a change in their consumption affects the

distribution of alcohol consumption in the population as a whole.

### Research

The project involves a quasi-experimental design with aggregate statistics collected from three small communities. Surveys were conducted in two of the three communities, and a prevention initiative was carried out in one of the communities surveyed. The intervention consisted of community development activities, information campaigns for the general public and local professionals, an alcohol education and counselling program for heavier drinkers, and policy-related activities.

Collaboration in a WHO-affiliated longitudinal study has provided another aspect which involves analysis of results from participants of a panel component of the survey.

A systematic tabulation of aggregate data on alcohol consumption, alcohol-related health problems and police data is being developed. The results of this tabulation are particularly necessary for presenting trends and patterns in consumption and alcohol-related problems in the three study communities, in order to monitor any changes during the intervention period.

Both survey and alcoholic beverage sales data have provided indications of heavy drinking in these communities. Survey respondents' views illustrate that alcohol use was acceptable in a variety of contexts and many alluded to complications related to heavy consumption. However, in contrast to this, excessive alcohol consumption did not appear to be viewed as an important community problem. Rather it was viewed as a problem of only a few, namely, the chronic problem drinkers.

### Implications

The prevention initiative has provided an opportunity to gain greater insight into one community through participatory and observational data collection. The analysis of these data is providing a general overview of community attitudes, concerns and action in terms of alcohol abuse. The results of this program will have important implications for research and prevention initiatives and will be of interest to researchers as well as policymakers, programmers, educators and clinicians interested in implementing and evaluating community-oriented interventions aimed at preventing heavy alcohol consumption and related problems.

### Selected Publications



N. Giesbrecht

- Giesbrecht, N. "Die Planung von Kommunal-Strategien zu Alkoholfragen: Aufzeichnung einer multi-Komponentiellen Präventiv-Initiative." ["Planning Community Strategies on Alcohol Issues: Notes from a Multi-component Prevention Initiative."] (German text, English summary) *Wiener Zeitschrift für Suchtforschung* 1987; 10(3/4): 9-18
- Giesbrecht, N. "Drinking Practices and Attitudes to Alcohol Use, Heavy Drinkers and Treatment — Divergence and Convergence by Gender in a Community Survey." *Alkoholbruk och dess Konsekvenser* (Helsinki: NAD-Publikation) 1987; 15: 111-134.
- Giesbrecht, N. and G. Conroy. "Options in Developing Community Action Against Alcohol Problems." In *Control Issues in Alcohol Abuse Prevention: Strategies for States and Communities*, ed. Holder, H.D. Greenwich, Connecticut: J.A.I. Press Inc., 1987: 315-335.
- Giesbrecht, N. and P. Pranovi. "Prevention Agenda in the Context of Drinking Cultures." In *Prevention, Alcohol and the Environment. Papers and reports from a Symposium held in Toronto, Canada, March 18-19, 1985*, eds. Giesbrecht, N. and A.E. Cox. Toronto: Addiction Research Foundation, 1986: 43-57.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with Community Services Division and Educational Resources Division

**Investigators:** N. Giesbrecht with P. Pranovi and L. Wood

## Control Measures

**33**

### The Development and Working of Alcohol-control Policies in Canada

Alcohol controls are the main method which governments have for regulating alcohol consumption and controlling alcohol problems. Much research shows that where controls are weak and alcohol is highly available, there is more drinking and there are more adverse consequences. The main recent changes in alcohol controls have been changes in drinking ages, increased outlets for on-premise consumption, and greater advertising.

#### Research

The available literature on alcohol controls as well as statistics on consumption were examined. The review indicated that the availability of alcohol increased between about 1945 and 1975 as did drinking and drinking problems. However, since 1975 there has been a stabilization in alcohol consumption and an attendant reduction in problems such as liver cirrhosis. Much of this occurred while on-premises outlets increased and alcohol advertising budgets grew. The alcohol controls most likely to limit sales are increased drinking ages and higher real prices.

#### Implications

This work can be useful in deciding which alcohol controls to use in the future, and how such controls function during periods of increased and decreased alcohol consumption. Changes in drinking and how they relate to alcohol policies will continue to be monitored.

#### Selected Publications

- Smart, R.G. "The Development and Working of Alcohol-control Policies in Canada." *International Handbook on Alcohol Policies*. Greenwood Press, forthcoming.
- Smart, R.G. and E.M. Adlaf. "Age of Majority Cards and Drinking among Young People." *Journal of Alcohol and Drug Education*. 1987; 32(3): 60-64.

**Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Smart

**34**

### A Study of Happy Hours in Ontario

Happy hours have been a controversial aspect of alcohol policy for many years in Ontario. They were introduced in 1982 and banned after only a year and a half because some citizens and police argued that they promoted drinking, and especially drinking and driving. In addition, many tavern owners found that they were unpopular and sometimes led to excessive drinking. No previous study has been made anywhere of the effects of banning happy hours.

#### Research

A 1983 survey of drinking establishments in Metro Toronto found that about 41 per cent of hotels and 25 per cent of restaurants and taverns had happy hours. Most were of the reduced-price variety. When happy hours were banned, a study was made of drinking in several bars before and after the ban. No effect on drinking rates or amounts was found. In addition, sales data for alcoholic beverages and drinking-driving accidents were examined and again no before-and-after difference was seen.

#### Implications

These studies examine a short experiment in alcohol controls which

may or may not be repeated. The results contribute to our understanding of how small changes in availability may leave alcohol consumption unaffected. Happy hours involve only a small proportion of total drinking and hence a ban on them could have only a limited impact. Research on happy hours and other cheap or free drink situations (of which there are many) will be continued.

#### Selected Publications

- Smart, R.G. and E.M. Adlaf. "Banning Happy Hours: The Impact of Drinking and Impaired-driving Charges in Ontario, Canada." *Journal of Studies on Alcohol* 1986; 47: 256-258.

**Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Smart

**35**

### Studying the Introduction of Wine into Grocery Stores in Quebec

An important issue in alcohol controls in Ontario and other provinces is whether beer and wine should be sold in grocery stores. The issue has been debated at length with some people arguing that drinking and drinking problems would increase if the change were made. Previous studies have been made of such changes in the U.S., but the results are equivocal. In Canada, only Quebec has introduced grocery store wine and beer sales.

#### Research

A study has been completed on the effects of introducing wine into grocery stores in Quebec. Data on sales of wine and other beverages were examined before and after the change was made in 1979, and comparisons were made with what happened in Ontario. In general, the introduction of wine into grocery

stores in Quebec had no impact on wine sales or overall sales of alcoholic beverages.

### Implications

The relevance of these results for proposed changes in Ontario are difficult to estimate. Some people have suggested that both beer and wine should be sold in Ontario grocery stores. This would probably have a major impact on alcohol sales, as beer is the most popular alcoholic beverage. However, if only wine were sold in grocery stores and prices were increased substantially, as in Quebec, little impact on sales would be expected. Careful attention should be paid to the exact proposed changes (including price) when it is suggested that grocery store sales of alcoholic beverages be made. Any changes made in Canada should be carefully monitored to see what impact they have.

### Selected Publications

- Smart, R.G. "The Impact on Consumption of Selling Wine in Grocery Stores." *Alcohol and Alcoholism* 1986; 21: 233-236.

**Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Smart

36

## Drinking Under Special Occasion Permits

Special Occasion Permits (SOPs) are a neglected aspect of alcohol control policy and have not been studied. Some permits are for gratis distribution of alcohol at weddings, parties or church affairs and are well controlled. However, other permits are for large-scale events where alcohol is sold to an unselected and possibly underage clientele.

### Research

A study of SOPs in Canadian provinces found that the rate of permits varies greatly from province to province. In 1985-86, 156,000 were issued in Ontario. About 4 per cent of drinking outside the home was estimated to be done under SOPs.

Special Occasion Permits have a number of special problems. First, visits by inspectors are made impractical by the large number of SOPs issued. There is also a lack of supervision of underage drinkers. Further, SOP entrepreneurs bypass the controls placed on bars and restaurants by having no insurance and no server-training programs.

### Implications

Efforts are being made to review and improve the SOP situation in Ontario. The Liquor Licence Board of Ontario (LLBO) has developed a pamphlet outlining the responsibilities of SOP holders. About 100,000 have been distributed already. The LLBO is making an effort to reduce the number of permits where alcohol is sold.

### Selected Publications

- Single, E. *Special Occasion Permits/Permis de Circonference*. Toronto: Liquor Licence Board of Ontario, 1987
- Smart, R.G. "Drinking Under Special Occasion Permits: A Neglected Aspect of Alcohol Control Measures?" *Journal of Studies on Alcohol* 1988; 49: 196-199

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** R.G. Smart and E. Single

37

## Legal Controls on Drinking and Driving

The Canadian approach to the drinking

and driving problem has been predicated primarily on legal deterrence through the criminal justice option. Despite Canada's focus on legal controls, little research has been carried out to assess the effectiveness of this approach and to find ways to improve our current system.

### Research

Studies have focused on the four components of drinking-driving legal controls:

1. Law Generation: The 12-hour licence suspension law introduced in December, 1981, has recently been evaluated, showing a short-term reduction in the proportion of fatalities with positive blood alcohol concentrations. The increase in the legal drinking age in 1979 was evaluated for short-term effects, and the long-term effects are currently being evaluated using two data sets: the 10-year trend data from the Ontario high school survey and Ontario motor vehicle fatality data.
2. Enforcement: The effects of the 12-hour licence suspension law on driver recidivism were evaluated in collaboration with the Ontario Provincial Police, using a province-wide OPP data base. The characteristics and driving records of drivers whose licences were suspended for 12 hours were assessed. The majority of suspended drivers were young males with poor driving records. The recidivism rate was 20 per cent, with the drivers 25 and under more likely to repeat a drinking and driving offence than older drivers.

3. Adjudication: The adjudication process has been assessed by a province-wide survey of crown attorneys in collaboration with the Ministry of the Attorney General and the Association of Crown Attorneys. The survey found broad discrepancies



E. Single

in the adjudication and sentencing of drinking drivers in Ontario courts.

**4. Sanctioning:** The severity of sanctioning has been analyzed for its impact on the recidivism of convicted drinking drivers. These analyses indicate that various aspects of severity have generally small but statistically significant effects on recidivism. The final report will be completed in 1988.

### Implications

The data from all of these studies will be used to improve legal controls on drinking and driving. In future, defence attorneys and judges will be interviewed to obtain their perceptions of the drinking-driving adjudication process.



E. Vingilis

#### Selected Publications

- Liban, C., E. Vingilis and H. Blefgen. "The Canadian Drinking-driving Countermeasure Experience." *Accident Analysis and Prevention* 1987; 19: 159-181.
- Vingilis, E. "Deterrence: A Reconceptualization for the Alcohol, Drugs and Traffic Safety Problem." In *Alcohol, Drugs and Traffic Safety - T86*, eds. Noordzij, P.C. and R. Roszbach. Amsterdam: Elsevier Science Publishers B.V., 1987: 117-122.
- Vingilis, E., H. Blefgen, H. Lei, K. Sykora and R.E. Mann. "An Evaluation of the Deterrent Impact of Ontario's 12-Hour Licence Suspension Law." *Accident Analysis and Prevention* 1988; 20(1): 9-17.
- Vingilis, E. and V. Vingilis. "The Importance of Roadside Screening for Impaired Drivers in Canada." *Canadian Journal of Criminology* 1987; 29(1): 17-33.
- Vingilis, E., N. Wasyluk, H. Blefgen and S. Shamai. "The Ontario 12-Hour Administrative Licence Suspension Law Against Drinking-drivers: The Ontario Provincial Police Assessment of Offence and Drivers' Characteristics." *The Police Chief*, 1988: summer.

#### Grants

This work was supported in 1987 by the Ontario Ministry of the Attorney General.

#### Prevention Studies (Social and Biological Studies Division)

**Investigators:** E. Vingilis and R.E. Mann, with H. Blefgen, H. Lei, K. Sykora, D. Colbourne, P. Culver, B. Farmer, D. Hackett, C. Liban, R. Solomon, J. Treleaven, N. Wasyluk and S. Shamai

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### Cannabis Control Policies

Since the early 1970s, this program has been monitoring the official response to cannabis by means of official statistics of arrests, convictions and sentencing. An interest in the effects of criminalization on cannabis users led to a follow-up study in 1974-75 of 95 first offenders, which was published in *Cannabis Criminals* (1980). A replication of this work, with an extension of data collection to other courts in the province outside Metro Toronto, permitted further comparative analyses.

By compiling statistical information on the impact of criminalization for cannabis use, this research program seeks to contribute to more just, humane and effective control policies.

#### Research

Two related lines of research are currently active in this program:  
1. Trends in Official Statistics: Efforts are being directed toward improving the data base of official statistics published by the Bureau of Dangerous Drugs. Trends in numbers of convictions for all cannabis offences (as well as for other illicit drugs, for comparative purposes) are being monitored. Conviction rates, by province, for five-year intervals are being calculated for the first time, now that illicit-drug data on a sufficient time span are available. Patterns in sentencing for cannabis possession are being followed closely in order to detect any overall shifts toward leniency or severity that may be occurring in the absence of legal change.

2. Deterring Cannabis Use: In a replication study conducted during 1981-82, 120 persons sentenced for

the simple possession of cannabis were interviewed, and half of the subjects were re-interviewed six months later. It was possible to compare the personal and legal characteristics of this group with those of the sample recruited in 1974-75. Although little change over time had occurred on these dimensions, the administrative practices of the court had shifted in the direction of greater efficiency. The study concludes that a steady stream of cannabis criminals has become a fact of criminal justice life in contemporary societies, thus removing one pressure – the burden on the police and courts – for reform of the cannabis laws.

This area is also concerned with the ways in which legal factors, particularly perceived certainty and severity of punishment, affect drug-taking behaviour. The causal ordering of perceptions and behaviour is a key measurement issue in the deterrence literature. Data obtained from a longitudinal study of 120 cannabis offenders were analyzed to test two deterrence models: one using projected behaviour and one using actual, subsequent behaviour. The findings demonstrate that a projected measure of cannabis use provides a good estimate of later cannabis use.

#### Implications

This work highlights the unintended and potentially severe costs that accrue to a prohibitionist policy. The assumed benefit of deterrence – that the threat of punishment will effectively discourage use – has not been demonstrated. This research concludes that current policies are high-cost, low-benefit options for cannabis control, and suggests the exploration of less damaging alternatives. Such research has implications for the assessment of

current control policies and the development of effective alternatives to punitive responses.

In 1988-89 the monitoring of the impact of the federal drug strategy on the criminal justice response to illicit drugs will proceed in relation to official statistics of arrest and conviction.

#### **Selected Publications**

- Erickson, P.G. and G.F. Murray. "Cannabis Criminals Revisited." *British Journal of Addiction* 1986; 81: 77-81.
- Moreau, J.A.E. "Selected Statistics on Convictions for Illicit Drug Use in Canada." Appendix A in *Illicit Drugs in Canada: A Risky Business*, eds. Blackwell, J.C. and P.G. Erickson. Scarborough, Ontario: Nelson Canada, 1988; 449-455.
- Murray, G.F. and P.G. Erickson. "Cross-sectional Versus Longitudinal Research: An Empirical Investigation of Projected and Subsequent Criminality." *Social Science Research* 1987; 16: 107-118.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** P.G. Erickson, with G.F. Murray and J.A.E. Moreau

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### **A Study of Long-term Adult Cannabis Users**

The literature has neglected the long-term, regular cannabis user who fulfills otherwise conventional adult roles while persisting in the illegal habit. These long-term users are exposed to the potential adverse health consequences of use which may accumulate over time. As an older, employed and relatively stable group, they are also quite remote from the risk of detection of their illegal drug-use behaviour. It is, therefore, of interest to learn how such users perceive the relative significance of legal and health risks in decisions to continue, quit or moderate their intake of cannabis.

Also of interest is how such a group of adult users may function as role models for younger adults and possible socializers of children. Although much concern about the effects of cannabis is justly directed at children and young people, it is important to recall that policies affect, or are intended to affect, adults as well.

#### **Research**

An interview study of 105 cannabis-using adults in the community has been conducted. The data were analyzed to determine the relative significance of legal and health risks in relation to frequency of ongoing cannabis use. The user's interest in the political aspects of cannabis law reform was also assessed.

The results indicate that such users are largely unaffected by legal and health concerns, and are unlikely to become an active force for drug law reform. The factors that did affect their frequency of cannabis use were those not readily amenable to policy manipulation (e.g., gender, marital status, age of first use and importance of cannabis to them).

#### **Implications**

One implication of this research is that the more entrenched or acceptable cannabis use is in the adult population, the more difficult and inconsistent it becomes to rely on legal threat as a deterrent to the youthful population. The knowledge gained from this research will also contribute to more just, humane and effective control policies.

#### **Selected Publications**

- Erickson, P.G. "Living with Prohibition: Regular Cannabis Users, Legal Sanctions and Informal Controls." *International Journal of the Addictions*, in press.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** P.G. Erickson, with G.F. Murray and J.A.E. Moreau

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### **The Effects of Pack Size on Smoking Behaviour**

Most cigarette packs in Canada contain 25 cigarettes. In some provinces and in the U.S., packs of 20 are most common. This research program studied the effects of cigarette-pack size on smoking behaviour and on reports of smoking behaviour. Findings on this matter could have important implications for measures aimed at controlling the use of tobacco.

#### **Research**

In this study, archival data sets and the results of a recent Gallup survey were analyzed. It was found that the purchase of larger packs of cigarettes is directly associated with reports of smoking more cigarettes per day.

#### **Implications**

The results suggest that pack size may influence the amount smokers smoke each day. This has significant public policy implications. Smaller packs might promote less heavy smoking, thus reducing the health costs to society of cigarette smoking.



#### **Selected Publications**

- Kozlowski, L.T., T. Heatherton and R.G. Ferrence. "Pack Size, Reported Cigarette Smoking Rates, and Heaviness of Smoking." *Canadian Journal of Public Health*, in press

#### **Sociobehavioural Research (Clinical Institute Division)**

collaboration with Prevention Studies (Social and Biological Studies Division)

**Investigators:** L.T. Kozlowski and R.G. Ferrence

**41****The Impact of Alcohol Advertising on Consumption**

Alcohol advertising and its control have been important and controversial areas. Some people claim that alcohol advertising has no impact on overall sales but does affect sales of individual brands. Others maintain that advertising does affect decisions, especially those of young people, about whether and how much to drink. Research done in the past has typically not been of an experimental nature and hence firm conclusions are difficult to make.

**Research**

This program has conducted several experimental studies of the impact of alcohol advertising on consumption, with no effect demonstrated. However, a recent experimental study of the effects of wine commercials on wine drinking by women does indicate a limited effect on some women.

A review has also been made of the literature on alcohol advertising, including studies made at the ARF and elsewhere. This review covers a wide variety of econometric and experimental studies. It concludes that econometric and experimental studies, as well as studies of advertising bans, indicate either no effect of advertising or at best a weak effect with some segments of the drinking population.

**Implications**

In general, the results of studies in this area indicate that factors of peer influence and price have far more effect on drinking than does advertising. Thus, controls on advertising are likely to be relatively ineffective in controlling drinking or drinking problems, especially in

comparison to other availability factors. A new econometric study will examine how alcohol advertising related to alcohol consumption over the past 10 years, a time when consumption stabilized.

**Selected Publications**

- Kohn, P.M. and R.G. Smart. "Wine, Women, Suspiciousness and Advertising." *Journal of Studies on Alcohol* 1987; 48: 161-166.

**Prevention Studies (Social and Biological Studies Division)**

**Investigator:** R.G. Smart

**42****Effects of Television Programming and Advertisements on Alcohol Consumption**

The effects on viewers of portrayals in television programs of alcohol use and of alcoholic beverage advertisements have been debated for years. Relevant empirical evidence is sparse and inconclusive, however. Also, no studies have used alcohol abusers as subjects. Since different populations might be differentially affected by alcohol cues that occur while watching television (i.e., alcohol abusers might be placed at risk of relapse), different sub-populations should be examined.

The objective of this research program is to assess and evaluate the effects of television advertisements for alcoholic beverages and portrayals of alcohol use in television programs on the drinking behaviour and cognitive processes of normal drinkers and alcohol abusers.

**Research**

Two experimental studies are active in this program:

1. The first study, which is now complete, assessed the drinking

behaviour of 96 male, normal drinker college students after they viewed a videotape of a popular prime-time television program complete with advertisements. Different versions of the videotape were used to evaluate the effects of a television program with and without alcohol scenes as crossed with the effects of three different types of advertisements (e.g., beer, nonalcoholic beverages and food). It was found that although the drinking behaviour of normal drinkers was not affected by alcohol advertisements and alcohol use portrayals on television, these factors did produce a cognitive effect measured as an enhanced positive evaluation of beer.

2. The second study, scheduled to be completed in 1989, is similar to the first but involves, as subjects, 96 alcohol abusers who are not committed to abstinence. The subjects will complete various forms before and after television viewing. The dependent measure for alcohol abuser subjects is their ratings of their self-confidence to resist the urge to drink heavily in various situations. Confidence ratings before and after viewing the videotape will be compared.

**Implications**

The results of the first study suggest that while alcohol cues present in television programming and advertisements may not have a direct effect on drinking behaviour, they can produce cognitive effects that could at some later date increase the likelihood of drinking. Viewers and policy-makers should be aware of this possibility.

The findings of the second study, when it is completed, could have implications for treatment if it were to be found, for instance, that alcohol

abusers feel less able to resist the urge to drink while watching television scenes including alcohol cues.



L.C. Sobell

**Selected Publications**

- Sobell, L.C., M.B. Sobell, D.M. Riley, F. Krajner, G.I. Leo, D. Pavan and A. Cancilla. "Effect of Television Programming and Advertising on Alcohol Consumption in Normal Drinkers." *Journal of Studies on Alcohol* 1986; 47: 333-340.

**Sociobehavioural****Research (Clinical Institute Division)**

**Investigators:** L.C. Sobell and M.B. Sobell

**43**

### **Drinking Cultures and Control Experiences: Comparative Studies of National Change**

This project is a sequel to the *International Study of Alcohol Control Experiences* (ISACE), completed some years ago, which generated three books and a number of published papers. The ISACE project involved a comparative analysis of the post-war experiences in seven countries with regard to alcohol control and regulation, production and consumption, drinking-related complications and societal responses to alcohol issues. The seven jurisdictions included in this project were California, Finland, Ireland, Ontario, the Netherlands, Poland and Switzerland.

**Research**

The current project extends the time period under consideration and focuses on jurisdictions not included in the ISACE project. The goals are to provide descriptions and analyses of the consumption trends, changes in drinking patterns, control measures and drinking-related complications in

six countries from 1950 to 1985. A researcher working in or well acquainted with the particular jurisdiction is completing a report on each country.

The results of the project will be reported in a monograph with chapters on Australia, Austria, Iceland, Italy, Japan and Sweden. An introductory chapter will be provided by Klaus Mäkelä, the coordinator of the international component of the ISACE project. The book is being edited by Irmgard Eisenbach-Stangl, Norman Giesbrecht and Leif Lenke.

**Implications**

The results of this project will provide an elaboration and extension of a line of research initiated with the ISACE project. The project will also provide a basis for comparisons of the experiences in two adjacent European countries (Austria and Italy), two Nordic countries (Iceland and Sweden), and the experiences of Japan and Australia.

It is hoped that the project will encourage researchers in other jurisdictions to initiate investigations of temporal changes in alcohol control experiences and thus build on the findings in reports available to date and proposed for this project.

**Grants**

This project has no centralized funding, with each researcher arranging support from his or her respective research centre. The Finnish Foundation for Alcohol Studies has provided support for translation of one chapter.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with research centres in several other countries

**Investigators:** N. Giesbrecht, I. Eisenbach-Stangl and L. Lenke, with K. Mäkelä, K. Minai, H. Olafsdóttir, F. Prina and R. Room

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### **Impact of Major/Sudden Changes in Alcohol Availability and Consumption on Alcohol-related Casualties and Social Problems**

A book entitled *Alcohol Policies in Public Health Perspective* (Bruun et al., 1975) included plans to analyze sudden changes in alcohol consumption to see what, if any, alcohol policy measures can be derived from these experiences. More recently, a study along these lines was proposed in one of the workshops of the International Symposium on Alcohol-related Casualties (Toronto, August, 1985). The impact of changes in availability of alcohol on certain chronic complications linked to drinking has been documented in the monograph by Bruun et al., and other studies; but their impact on acute and social complications has not been as extensively studied. This project will have relevance for alcohol policy discussions since major or sudden changes in access to alcohol are often the result of actions planned and implemented by government.

**Research**

A monograph is in preparation and will include: (1) several review papers on existing literature on studies of major/sudden changes in alcohol availability and consumption in different countries and jurisdictions; (2) a series of case studies of sudden/major change experiences – such as dramatic shifts in licensing regulations or alcohol distribution arrangements – involving new analyses of existing data or newly collected data; and, (3) a commentary on methodological and conceptual

issues for those who may wish to conduct natural experiments in the future. In selecting case study material, the coordinators sought material not previously published, and particularly experiences that had not been documented to date. The editors of this monograph are Esa Österberg, Norman Giesbrecht and Jacek Moskalewicz.

#### **Implications**

The results of this work will be of particular interest to developing countries that are experiencing pressures to increase production and access to alcohol, but may not have the data base to demonstrate the potential implications of changes in access. Further studies of particular unresolved methodological or substantive issues, or of experiences in other countries or jurisdictions may emerge with the dissemination of the results of this project.

#### **Prevention Studies (Social and Biological Studies Division)**

**Investigators:** N. Giesbrecht, E. Österberg and J. Moskalewicz, with other researchers contributing reports

## **Reinforcement and Self-administration**

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### **Self-regulation of Alcohol Consumption in Humans**

Biological differences among individuals regarding the self-regulation of alcohol consumption has often been used to explain alcohol abuse. The present research provides a model where putative differences in self-regulation should be empirically demonstrated. This will provide a basis for assessing self-regulation in terms of individual differences as well as assessing the effectiveness of pharmacological interventions to reduce alcohol consumption.

#### **Research**

An innovative methodology has been developed to assess the desirability of alcohol in a regimented self-administration procedure, with which the self-regulatory factors in consumption will be assessed and delineated. Subjects are required, within limits, to consume 18 mini-drinks, each the equivalent of one-third of a standard drink, one every five minutes. The desirability of each drink is monitored (on a scale of -100 to +100) throughout the session, as are a variety of mood and somatic measures.

In the first study a number of qualitative differences between heavy and light drinkers were revealed. Of central importance was the finding that the desirability ratings for heavy drinkers reflected an increasing monotonic function over the session. On the other hand, light drinkers showed an initial increase that was

followed by a decreasing function that was well into the negative range.

#### **Implications**

This methodology has a variety of applications. For example, it can be used to assess directly pharmacological interventions which are hypothesized to reduce the reinforcing effects of alcohol. It can also be used to investigate genetic factors in self-regulation of consumption.



C.X. Poulos

**Sociobehavioural Research (Clinical Institute Division),** in collaboration with Biochemical Research (Social and Biological Studies Division)  
**Investigators:** C.X. Poulos, with C.A. Narano and H. Cappell

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### **Immunology of Aversive Reactions to Alcohol**

It is well documented that about 40 to 50 per cent of Orientals lack an enzyme to destroy acetaldehyde, a product of alcohol metabolism. As a result, they experience unpleasant reactions when they consume alcoholic beverages. These individuals are protected against alcoholism. Current therapy of alcoholism with the drug disulfiram (Antabuse®) aims at the same type of reaction. However, compliance with medication instructions constitutes a problem, and a large proportion of individuals for whom this therapy is recommended stop taking the drug.

The aim of this research is to produce a long-lasting aversive reaction to alcohol by means of an immunological reaction to products of alcohol degradation.

**Research**

The program has generated IgE immunoglobulins that react against acetaldehyde-containing epitopes in mice by immunization with (pollen-like) aluminum hydroxide gels coated with acetaldehyde-conjugated proteins. These immunoglobulins have produced an allergic reaction to alcohol-derived products. The studies have also led to the production of allergy-inducing monoclonal antibodies, which can be generated in large amounts *in vitro*.

The investigators have further demonstrated that about one in 400 individuals experiences natural allergic-like reactions to all alcoholic beverages and therefore consumes almost no alcohol. These individuals also show other types of allergies, and about half of them have high levels of IgE antibodies against acetaldehyde-protein adducts in their blood.

**Implications**

The long-term implications of this work relate to the possibility of inducing aversive reactions to alcohol by passive immunization schedules. This could contribute to efforts to overcome the problem of noncompliance by patients in aversive therapy of alcoholism.

**Selected Publications**

- Israel, Y., E. Hurwitz, O. Niemelä and R. Arnon. "Monoclonal and Polyclonal Antibodies Against Acetaldehyde-containing Epitopes in Acetaldehyde-protein Adducts." *Proceedings of the National Academy of Sciences (USA)* 1986; 83: 7923-7927.
- Israel, Y., A. Macdonald, T. Waks and O. Niemelä. "Induction of an Allergic Reaction to Alcohol Metabolites by Immunization." *Archivos de Biología y Medicina Experimental*, in press.
- Israel, Y., O. Niemelä, J. Khanna and H. Orrego. "Antibodies Against Acetaldehyde-modified Epitopes: A New Perspective." In *Genetics and Alcoholism, Volume 241, Progress in Clinical and Biological Research*, eds. Goedde, H.W. and D.P. Agarwal. New York: Alan R. Liss Inc., 1987: 283-289.

- Teichert-Kuliszewska, K., Y. Israel and B. Cinader. "Alcohol Dehydrogenase is Not a Major Determinant of Alcohol Preference in Mice." *Alcohol* 1988; 5: 45-47.

**Biochemical Research (Social and Biological Studies Division)**

**Investigator:** Y. Israel

**47**

**Brain Substrate of Opiate Self-administration**

In a simple biological picture, drug-taking can be conceptualized as being maintained by one or both of two mechanisms:

- 1) drug administration relieves the unpleasant consequences of withdrawal, if the subject is physically dependent; or,
- 2) the drug interacts with the individual's central nervous system to produce effects that the individual will seek out.

The latter process, called positive reinforcement (or simply reinforcement), is the fundamental biological process underlying commencement of drug-taking, as well as continued drug-taking in the absence of physical dependence.

Very little is known about the brain mechanisms that reinforce drug-taking behaviour, or about the commonalities or differences in brain mechanisms involved in the reinforcement derived from different drugs of abuse. This research program uses animal models of drug-taking to study the brain cells and pathways involved in drug reinforcement.

**Research**

Research to date has focused on the opioids. The first step has been to obtain a map of the sites in the brain at which opioids act to initiate reinforcement processes. To do so, a

series of experiments have been conducted in which an opioid antagonist (a substance which binds to the specific sites on the cell membrane [receptors] at which the opioids act, and thus blocks the effects of drugs such as heroin and morphine) is injected in minute amounts into candidate brain sites. If a given site is involved in drug-taking behaviour, the antagonist will block opioid receptors that mediate reinforcement, and thus alter the extent and pattern of the animal's drug self-administration behaviour.

Several brain sites have already been identified as being involved in the production of reinforcement by heroin. Studies are now aimed at determining whether these same brain sites mediate other effects of opioids relevant to abuse.

**Implications**

Once a complete distribution of brain sites has been obtained for heroin, the research will focus on how brain function at these sites is altered by administration of various neurotransmitter substances and antagonists. The long-range objective is to describe how drugs of abuse interact with processes in the central nervous system and, with this knowledge, design potential pharmacological interventions.



W.A. Corrigall

**Selected Publications**

- Corrigall, W.A. "Heroin Self-administration: Effects of Antagonist Treatment in the Lateral Hypothalamus." *Pharmacology Biochemistry and Behavior* 1987; 27: 693-700.
- Corrigall, W.A. and F.J. Vaccarino. "Antagonist Treatment in Nucleus Accumbens or Periaqueductal Grey Affects Heroin Self-administration." *Pharmacology Biochemistry and Behavior* 1988; 30: 443-450.

•Vaccarino, F.J. and W.A. Corrigall. "Effects of Opiate Antagonist Treatment into Either the Periaqueductal Grey or Nucleus Accumbens on Heroin-induced Locomotor Activation." *Brain Research Bulletin* 1987; 19: 545-549.  
**Biobehavioural Research (Social and Biological Studies Division)**  
**Investigator:** W.A. Corrigall

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## A Behavioural Pharmacology of Nicotine

Animal self-administration offers a practical approach to testing interventions that might be used to reduce or stop drug-taking behaviour. Animals will do work (e.g., press a lever) to obtain intravenous infusions of a variety of drugs of abuse such as heroin, cocaine or amphetamine. However, for nicotine there have been few comprehensive models of self-administration developed. In addition, drug use can result in the development of tolerance and physical dependence. In the case of nicotine, it is not known how, or to what extent, these processes alter nicotine-taking behaviour. Nor is it known to what degree these processes are dependent upon conditioning factors.

### Research

The objectives of this research program are to develop a model of intravenous nicotine self-administration and to use it to assess neurobiological mechanisms of, and factors controlling, nicotine abuse. The program has been successful in obtaining self-administration behaviour for nicotine that is dependent upon the amount of the drug provided, sensitive to treatment with nicotine antagonists and altered by chronic treatment.

### Implications

Further work in this program will assess the degree to which pharmacological (i.e., drug) factors, as opposed to tolerance and dependence or conditioning factors, control nicotine self-administration. The long-term objective is to use this approach to understand the mechanisms that control nicotine abuse. This knowledge will have implications for treatment of nicotine addiction.

### Selected Publications

- Corrigall, W.A., S. Herling and K.M. Coen. "Evidence for Opioid Mechanisms in the Behavioural Effects of Nicotine." *Psychopharmacology* 1988; 96: 29-35.  
**Biobehavioural Research (Social and Biological Studies Division)**  
**Investigators:** W.A. Corrigall with S. Herling

49

## Conceptual Issues in the Study of Tobacco and Other Drugs

1. The boundary model of nicotine regulation attempts to provide a scheme for the simultaneous consideration of both psychosocial and biological factors in the control of drug-taking. Aversive, biologically-based boundaries (withdrawal effects and acute toxicity effects) are argued to place upper and lower limits on the self-administration of drugs of abuse. Within these limits or boundaries, psychosocial and situational factors have relatively greater control of drug-taking. This model figures as a component in a number of other projects on the role of nicotine in tobacco use. The boundary model is important because it helps to organize and explain the patterns of drug-taking that are observed.

2. There is ambiguity surrounding the term "craving". Some drug, alcohol and tobacco researchers employ the term to refer to any urge to use a drug (even a mild urge), while others employ the term to refer to mainly strong urges. The major problem with misuse of the term craving is that it leads to exaggerated claims and beliefs about the true nature of events. In other words, cravings are often used to hype findings. Restraint and care in the use of this term are needed by means of conceptual and empirical publications on the issue.

### Research

1. The objective of this line of research is to foster the development of the boundary model of nicotine regulation. One study asked smokers to supply two baselines. First they were asked to smoke normally, then to smoke as little as they could comfortably. Biochemical measures of intake showed that the users' senses of well-being were not strictly associated with different levels of intake.

Another study tried to identify questions that would be useful for assessing sensitivity to smoking. For example, smokers who reported that the first cigarette of the day made them feel light-headed or dizzy gave biochemical evidence of being lighter smokers, consuming less nicotine from their cigarettes.

2. Data from several sources are being used to establish how both researchers and clients make use of the term craving to describe subjective desires to use drugs. Drug users were asked to define what they mean by a craving (is it a strong desire or any desire to use, even a weak one?) and to compare their urges to use different drugs.

One-third of drug users report that their strongest urge for cigarettes was stronger than their urges for other drugs; one-third said the urges were similar; one-third said that the urges for cigarettes were less strong. These results are under review.

### Implications

The boundary model will be applied to the study of the role of standard nicotine yields in the dose of nicotine attained by smokers. Work on the drug user's perception of drug use is continuing.

### Selected Publications

- Kozlowski, L.T., R.E. Mann, D.A. Wilkinson and C.X. Poulos. "Cravings' are Ambiguous: Ask About Urges or Desires." *Addictive Behaviors*, in press.
- Kozlowski, L.T. and D.A. Wilkinson. "Use and Misuse of the Concept of Craving by Alcohol, Tobacco and Drug Researchers." *British Journal of Addiction* 1987; 82: 31-36.
- Kozlowski, L.T. and D.A. Wilkinson. "Comments on Kozlowski's and Wilkinson's 'Use and Misuse of the Concept of Craving by Alcohol, Tobacco and Drug Researchers': A Reply from the Authors." *British Journal of Addiction* 1987; 82: 489-492.

### Grants

The Natural Sciences and Engineering Research Council of Canada currently supports research in this program.

### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.T. Kozlowski and D.A. Wilkinson

## 50

### Clinical Pharmacological Methods for Assessing the Toxicity of Psychoactive Drugs

Pharmacotherapy with psychoactive and other drugs is common. Drugs introduced into the market are usually studied in a limited number of patients. Therefore, unexpected adverse drug reactions and interactions do occur. This program has been developing new methodologies for assessing the

toxicity of psychoactive drugs (including adverse drug reactions and interactions) for the past 15 years.

### Research

A systematic approach for assessing the pharmacodynamic and pharmacokinetic interactions of ethanol and psychoactive drugs (e.g., antidepressants, anxiolytics) has been developed using a microcomputer-based testing battery. This system can be used to detect subtle effects of psychoactive drugs.

In addition, a new Bayesian method for assessing the toxicity of central nervous system (CNS) drugs has been developed. This method has been used to assess the CNS toxicity of drugs recently introduced on the Canadian market. These studies allow the benefit/risk ratio of various CNS drugs to be determined.

Researchers working in the area of adverse drug reactions and interactions have also developed a network for the referral and in-depth study of patients with a combination of Bayesian and biochemical techniques.

### Implications

The innovative approaches developed in this program are used world-wide. Since drug therapies continue to be produced and introduced into the market, assessing the toxicity of CNS drugs will be an ongoing concern.



C.A. Naranjo

### Selected Publications

- Kramer, M.S., T.A. Hutchinson, D.A. Lane, J.K. Jones and C.A. Naranjo. "A Bayesian Approach to Causality Assessment for Adverse Drug Reactions: Analysis of a Case of Exfoliative Dermatitis." *Drug Information Journal* 1986; 20: 523-533.
- Naranjo, C.A. "A Clinical Pharmacologic Perspective on the Detection and Assessment of Adverse Drug Reactions." *Drug Information Journal* 1986; 20: 387-393.

- Naranjo, C.A. "A Bayesian Approach to Assessment of Adverse Drug Reactions: Evaluation of a Case of Cholestatic Jaundice." *Drug Information Journal* 1986; 20: 465-471.
- Naranjo, C.A. and U. Bustos. "Adverse Drug Reactions." In *Principles of Medical Pharmacology*, 5th edition, eds. Kalant, H. and W.H.E. Roschlau. Toronto: University of Toronto Press, 1987: 757-766.
- Naranjo, C.A. and E.M. Sellers. "Fatty Acids Modulation of Drug Binding to Plasma Proteins." In *Drug-protein Binding*, eds. Reidenberg, M.M. and S. Erill. New York: Praeger Scientific, 1986: 233-253.
- Wu, P.H., T. Pham and C.A. Naranjo. "Nifedipine Delays the Acquisition of Tolerance to Ethanol." *European Journal of Pharmacology* 1987; 139: 233-236.

### Biomedical Research (Clinical Institute Division)

**Investigators:** C.A. Naranjo and E.M. Sellers, with U. Bustos

## 51

### Clinical Pharmacological Methods for Assessing the Abuse Potential and Dependence Liability of Psychoactive Drugs

The pharmaceutical industry continues to produce a large number of anxiolytic and other CNS active drugs whose abuse potential is unknown. However, according to Canadian law, it is required that all these substances be tested for their abuse potential and dependence liability before they are introduced into the market. This research program was initiated because no such program to assess abuse potential and dependence liability existed in Canada.

### Research

The objectives of this ongoing research program are to assess the abuse potential and dependence liability of anxiolytic, analgesic and other central nervous system (CNS) active drugs through clinical pharmacological methods. A testing

battery has been developed, and it has been demonstrated that therapeutic doses of benzodiazepines can induce physical dependence. Projects currently under way include assessing the abuse potential and dependence liability of midazolam and buspirone, and studies on the correlation of drug use and problems.

### Implications

The large number of anxiolytics and analgesics that have been synthesized in recent research ensure that this program will be of long-standing importance. Many are currently under clinical investigation.

One of the long-term goals of this program is to develop a set of guidelines for pharmaceutical companies to develop compounds with low abuse and dependence liability.

### Selected Publications

- Busto, U. and E.M. Sellers. "Pharmacokinetic Determinants of Drug Abuse and Dependence: A Conceptual Perspective." *Clinical Pharmacokinetics* 1986; 11: 144-153
- Busto, U., E.M. Sellers, C.A. Naranjo, H. Cappell, M. Sanchez-Craig and K. Sykora. "Withdrawal Reaction After Long-term Therapeutic Use of Benzodiazepines." *New England Journal of Medicine* 1986; 315 (14): 854-859.
- Cappell, H., U. Busto, G. Kay, C.A. Naranjo, E.M. Sellers and M. Sanchez-Craig. "Drug Deprivation and Reinforcement by Diazepam in a Dependent Population." *Psychopharmacology* 1987; 91: 154-160.
- Cappell, H.D., E.M. Sellers and U. Busto. "Benzodiazepines as Drugs of Abuse and Dependence." In *Research Advances in Alcohol and Drug Problems, Volume 9*, eds. Cappell, H., F.B. Glaser, Y. Israel, H. Kalant, W. Schmidt, E.M. Sellers and R.G. Smart. New York: Plenum Press, 1986: 53-126.
- Carruthers, G., T. Goldberg, H. Segal and E.M. Sellers. *Drug Utilization: A Comprehensive Literature Review*. Report prepared for the Ontario Minister of Health, 1987.
- Naranjo, C.A. and E. Janecek. "Drug Development and Regulations." In *Principles of Medical Pharmacology, 5th edition*, eds. Kalant, H. and W.H.E. Roschlau. Toronto: University of Toronto Press, 1987: 837-848.
- Sanchez-Craig, M., H. Cappell, U. Busto and G. Kay. "Cognitive-behavioural Treatment for

Benzodiazepine Dependence: A Comparison of Gradual Versus Abrupt Cessation of Drug Intake." *British Journal of Addiction* 1987; 82: 1317-1327.

•Sellers, E.M. and R. Bendayan.

"Pharmacokinetics of Psychotropic Drugs in Selected Patient Populations." In *Psychopharmacology: The Third Generation of Progress*, ed. Meltzer, H.Y. New York: Raven Press, 1987: 1397-1406.

### Grants

Funding was provided by the Pan-American Health Organization and World Health Organization for a clinical pharmacology course for scientists in Latin America.

### Biomedical Research (Clinical Institute Division)

**Investigators:** E.M. Sellers, U. Busto, and C.A. Naranjo

## 52

### Factors Controlling the Voluntary Consumption of Alcohol by the Rat

Research into the causes, mechanisms and treatment of alcoholism requires an understanding of the factors that control the normal level of alcohol consumption. For obvious ethical reasons, much alcohol-related research that cannot be done on humans is done on the laboratory rat. It is therefore important to identify the factors that normally control voluntary consumption of alcohol by the rat, and test their applicability to humans.

### Research

Previous work in ARF laboratories had demonstrated that increased activity in the renin-angiotensin system (RAS) reduces alcohol consumption by the rat. The RAS is a hormonal system involving the interaction of substances produced in the kidney and certain parts of the brain that participate in the control of blood pressure and of water and salt balance in the body. The activity of the RAS has been manipulated by a series of surgical or

drug interventions, and the effects on alcohol intake studied. These interventions included: (1) raising the blood pressure by constricting the artery to one kidney, (2) administration of the active form of angiotensin, or injection of drugs that stimulate or reduce its production by different mechanisms (isoproterenol, fluoxetine, angiotensin-converting enzyme [ACE] inhibitors), (3) surgical destruction of the brain sites where angiotensin normally acts. The results confirmed that increased RAS activity led to lower alcohol intake, and decreased RAS activity led to higher intake.

Work in progress includes a study of the effects of fragments of the angiotensin molecule to identify the portion that is responsible for the effect on alcohol drinking, and a comparison of different ACE inhibitors to see which is the most effective in reducing alcohol intake.

Other factors controlling alcohol intake in normal rats include local actions in the stomach and upper small intestine. One study has shown that the amounts of alcohol consumed by different rat strains are inversely related to the speed of absorption of alcohol from the stomach and upper small intestine. Improved techniques of measuring rapid change in blood alcohol level are being tested to see whether the same inverse relation applies to individual rats within a given strain. Other work in progress involves modification of alcohol intake by cutting branches of the vagus nerve that carry information about stomach contents and liver metabolism to the brain.

Different genetic strains of rat, differing in reactions to alcohol, have been studied with respect to the relations between their initial brain

sensitivity to alcohol, their ability to develop tolerance to it, and their level of voluntary consumption of alcohol. Surprisingly, there was no consistent relationship among these three variables in different rat strains. However, one strain that had been bred specifically for high preference for alcohol did show greater ability to develop tolerance.

Other current studies have shown that body weight reduction by food restriction, and increased palatability of alcohol by the addition of saccharin, increase the voluntary drinking of alcohol by the rat.

### Implications

Accurate definition of the factors controlling normal alcohol intake may help to direct future study of the abnormalities leading to excessive intake, and offer possible therapeutic interventions. A clinical trial based on the RAS work is being conducted in collaboration with Drs. C.A. Naranjo and E.M. Sellers; the effects of an ACE inhibitor, enalapril, is being tested in human heavy drinkers. Further work in rats will be directed to explanation of the mechanisms by which RAS activity controls alcohol intake. Future directions of the work on local factors in the stomach and intestine will depend on the results of studies in progress.

### Selected Publications

- Grupp, L.A., E. Perlanski, F.H.H. Leenen and R.B. Stewart. "Voluntary Alcohol Intake is Attenuated in Two-kidney, One-clip, But Not in One-kidney, One-clip Goldblatt Hypertensive Rats." *Alcohol* 1988; 5: 173-179.
- Sharma, H. "Relationship Between Initial Sensitivity, Tolerance and Alcohol Consumption." Master's Thesis, University of Toronto, (in preparation).
- Spinosa, G., E. Perlanski, F.H.H. Leenen, R.B. Stewart and L.A. Grupp. "Angiotensin Converting

Enzyme Inhibitors: Animal Experiments Suggest a New Pharmacological Treatment for Alcohol Abuse in Humans." *Alcoholism: Clinical and Experimental Research* 1988; 12: 65-70.

•Stewart, R.B., E. Perlanski and L.A. Grupp. "Area Postrema and Alcohol: Effects of Area Postrema Lesions on Ethanol Self-administration Pharmacokinetics and Ethanol-induced Conditioned Taste Aversion." *Alcoholism: Clinical and Experimental Research*, 1988; 12: 698-704.

### Grants

Work in this program is supported by grants from the Alcoholic Beverage Medical Research Foundation, Ciba-Geigy (Canada) Ltd., Merck, Sharpe & Dohme, Ltd. and Labatt Co. Ltd.

### Biobehavioural Research (Social and Biological Studies Division)

**Investigators:** L.A. Grupp, J.M. Khanna, A.D. Lé and M.A. Linseman

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### Experimental Models of Alcoholism in the Rat

The consumption of alcohol and other addictive drugs is reinforced by some rewarding action of these substances exerted at an as-yet-unidentified site in the brain. To help in the identification of this alcohol reinforcement site, it is necessary to have an animal model that displays the essential features of alcoholism as seen in humans. Such an animal model will also permit experimental tests of potential therapeutic agents for preventing this reinforcement. This program is attempting to produce such models. In addition, it includes research on the neurochemical nature of the reinforcement system for alcohol, specifically on the possible roles of two chemical messenger substances in the brain – dopamine and opioid peptides.

### Research

One study attempted to examine the reinforcing properties of alcohol by observing the rat's response to a specific environment in which it had

voluntarily consumed alcohol in preference to water. Surprisingly, it demonstrated an aversion rather than a preference for that environment, even though the rats had voluntarily drunk enough to produce blood alcohol levels usually associated with intoxication.

Another study is examining the effects of training on alcohol intake in genetically selected alcohol-preferring and non-preferring rat lines. The animals learn to press separate levers to obtain food, water or alcohol solution (the *operant model*). Earlier work showed that a non-preferring line (ANA) could be trained to consume large amounts of alcohol despite its initial aversion, and the preferring line (AA) could be trained to drink enough to produce gross intoxication and tolerance. A similar study with two other genetically selected lines, the P (alcohol-preferring) and NP (alcohol non-preferring), is in progress. One problem with this operant model is that the rats must be partially food-deprived before they will learn to press a lever to obtain alcohol.

Another approach developed here is to offer alcohol for a short period only, on a regular once-a-day basis. In this *limited access model*, freely fed rats reliably consume mildly intoxicating amounts of alcohol. It has not led to sustained high intakes such as those seen with the operant model, but it can be used to study factors that influence the size of individual bouts of alcohol consumption. To date, it has been applied to investigations of the effects of dopamine and of opioid drugs. Dopamine is believed to be the main chemical messenger in the brain system for reinforcement of food and water intake, and for self-administration of cocaine and amphetamine. It was found, however,



L.A. Grupp

Tolerance and Alcohol Consumption." Master's Thesis, University of Toronto, (in preparation).

•Spinosa, G., E. Perlanski, F.H.H. Leenen, R.B. Stewart and L.A. Grupp. "Angiotensin Converting

that it has very little effect on the amount of alcohol consumed in the limited access model. In contrast, opiate drugs acting in the brain increased alcohol intake substantially, and opiate-blocking drugs decreased it.

### Implications

If the current approaches yield reliable animal models with high voluntary intake and development of tolerance and physical dependence, attempts will be made to identify the brain site(s) at which reinforcement by alcohol takes place. One approach will be to inject opiate drugs, opiate blockers, and other drugs into specific points in the brain and observe at which points they produce changes in alcohol intake by the animals. Another will be to preload the brain with radioactively labelled chemical messenger substances, and then use image-analyzing techniques to identify the sites at which the labelled substances are released when alcohol exerts its reinforcing effects.

The results of such studies should offer directions for future attempts to modify the reinforcement process therapeutically, so as to make alcohol less rewarding to the excessive drinker.



M.A. Linseman

Ethanol in the Rat." *Pharmacology Biochemistry and Behaviour* 1986; 24: 1369-1375.

### Biobehavioural Research (Social and Biological Studies Division)

**Investigators:** L.A. Grupp, H. Kalant and M.A. Linseman

#### Selected Publications

- Linseman, M.A. "Alcohol Consumption in Free-feeding Rats: Procedural, Genetic and Pharmacokinetic Factors." *Psychopharmacology* 1987; 92: 254-261.
- Stewart, R.B. and L.A. Grupp. "Conditioned Place Aversion Mediated by Orally Self-administered

## Processes of Addiction

54

### Motivational Properties of Drugs and Drug Withdrawal

It is widely believed that many addicts continue to use drugs because of a fear of the punishing effects of drug withdrawal (abstinence syndrome). However, there is surprisingly little factual information on the actual importance of the withdrawal reaction as a motivator of continued drug use. This work examines this negative reinforcement of drug use, and is complementary to the studies of positive reinforcement described in "Brain Substrate of Opiate Self-administration" (see Research Entry #47).

#### Research

The opiate antagonists, such as naloxone, precipitate a withdrawal reaction in opiate-dependent subjects. One study, using four different opiate antagonists in opiate-dependent rats, showed that all were more effective in causing a withdrawal reaction if injected directly into the brain than if given subcutaneously; therefore the site of initiation of the withdrawal reaction is in the brain itself. Since there are natural opioid substances normally present in the brain, the naloxone-like antagonists might be expected to precipitate a withdrawal-like reaction in the normal (nondependent) animal. This was found to be true, but the reaction was much less marked than in the opiate-dependent animal.

In order to demonstrate and study the punishing (aversive) effects that motivate the behaviour of animals

undergoing withdrawal reactions, several different tests were employed: (1) aversion to a specific environment in which the animal had previously experienced a withdrawal reaction, (2) aversion to a novel flavour that the animal first tasted while undergoing an opiate withdrawal reaction, (3) burying an object that was first encountered during a withdrawal reaction (the rat superstitiously buries the object, to avoid experiencing another withdrawal reaction), and (4) disruption of the animal's feeding behaviour by presentation of a light or sound signal to which the animal had previously been exposed during a withdrawal reaction.

The work has yielded several important findings. Behaviour can be motivated by the subjective effects of a withdrawal reaction that is too mild to be recognized by objective external signs. Drugs such as naloxone and other opioid antagonists fail to produce the aversive effects of withdrawal in very young rats, at doses that are very effective in older ones. Withdrawal reactions from chronic amphetamine treatment differ from opiate withdrawal reactions. Haloperidol, the most specific blocker of amphetamine action, did not produce any aversive motivational effects, whereas blockers of nicotine did so in nicotine-dependent animals.

#### Implications

This work will help to explain the basic brain mechanisms underlying the rewarding effects of drugs and the aversive effects of drug withdrawal. At the same time, it will clarify the relative importance (or lack of it) of the withdrawal reaction as a motivator of continued drug use. This information will be of practical value to therapists in the management of patients seeking or undergoing treatment for addiction.

Future work will be directed at accurate mapping of the brain sites involved in the aversive effects of withdrawal, and at quantitative assessment of the importance of withdrawal from drugs other than opioids (e.g., tranquilizers, alcohol, stimulants, etc.) as motivators of behaviour.

#### Selected Publications

- Mucha, R.F. "Is the Motivational Effect of Opiate Withdrawal Reflected by Common Somatic Indices of Precipitated Withdrawal? A Place-conditioning Study in the Rat." *Brain Research* 1987; 418: 214-220.
- Mucha, R.F., M.D. Gritt and C. Kim. "Aversive Properties of Opiate Withdrawal Studied in Rats." *N.I.D.A. Research Monographs* 1986; 75: 567-570.
- Mucha, R.F. and A. Herz. "Preference Conditioning Produced by Opioid Active and Inactive Isomers of Levorphanol and Morphine in the Rat." *Life Sciences* 1986; 38: 244-249.
- Mucha, R.F. and M.J.K. Walker. "Aversive Property of Opioid Receptor Blockade in Drug-naïve Mice." *Psychopharmacology* 1987; 93: 483-488.
- Shippenberg, T.S., M.J. Millan, R.F. Mucha and A. Herz. "Evidence for an Involvement of B-endorphin and U-opioid Receptors in Mediating the Aversive Effect of Lithium in the Rat." *European Journal of Pharmacology*, in press.
- Walker, M.J.K., B. Leavitt and R.F. Mucha. "Saccharin Exposure Increases the Potency and Aversive Property of Naloxone in Drug-naïve Rats." *Life Sciences* 1988; 43: 1305-1311.

#### Grants

Work in this program is supported by operating grants from the Medical Research Council of Canada and the Natural Sciences and Engineering Research Council, and a new faculty grant from the University of Toronto.

#### Biobehavioural Research (Social and Biological Studies Division)

**Investigator:** R.F. Mucha

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#### Factors Affecting the Development of Cross-tolerance

Chronic intake of alcohol will result in the development of tolerance to its effects. Alcoholics also tend to abuse other drugs. Traditionally, it has been

thought that simple exposure to one drug will also result in diminishing the response to other drugs that have similar mechanisms of action or similar pharmacological effects. This is known as cross-tolerance.

Recent work in ARF laboratories, however, suggests that cross-tolerance does not necessarily develop among drugs that produce similar effects. Rather, it depends on pharmacological specificity of the drugs, as well as on behavioural factors associated with chronic drug treatment.

#### Research

Simple exposure to high doses of ethanol produced tolerance to various behavioural and physiological effects of ethanol but failed to confer cross-tolerance to similar effects of pentobarbital, a highly lipid-soluble barbiturate (i.e., one that is highly soluble in the fatty constituents of the cell membrane). Such treatment, however, resulted in cross-tolerance to similar effects induced by a much less lipid-soluble barbiturate, barbital. On the other hand, when ethanol treatment was carried out in conditions that allowed the subjects to practise the test while intoxicated, or that permitted Pavlovian conditioning between drug administration and specific environmental cues, cross-tolerance to pentobarbital or to hydralazine (an antihypertensive drug) was readily observed.

Current projects examine the development of cross-tolerance among various alcohols, benzodiazepines and barbiturates in a symmetrical pattern. The various experimental models involve simple drug exposure, intoxicated practice, or drug-environment conditioning.

#### Implications

The results offer an exciting challenge to the concept that alcohol and barbiturates exert their actions solely by affecting the physical properties of nerve cell membranes, and that therefore these drugs do not display any specificity. The working hypothesis is that the site(s) of action of various alcohols, barbiturates or other anaesthetics might depend on their degree of lipid-solubility, and that in the absence of behavioural factors, cross-tolerance is more likely to develop among drugs that have similar degrees of lipid-solubility. This line of research has potential clinical application in selecting the drug of choice for management of alcohol withdrawal or pharmacological replacement therapy. It also has potential in other medical areas where interactions arising from multiple use of sedative-hypnotic drugs are of concern.



A.D. Lê

#### Selected Publications

- El-Ghundi, M., H. Kalant, A.D. Lê and J.M. Khanna. "The Contribution of Environmental Cues to Cross-tolerance Between Ethanol and Pentobarbital." *Psychopharmacology* 1989; 97: 194-201.
- Gougos, A., J.M. Khanna, A.D. Lê and H. Kalant. "Tolerance to Ethanol and Cross-tolerance to Pentobarbital and Barbital." *Pharmacology Biochemistry and Behavior* 1986; 24: 801-807.
- Lê, A.D., J.M. Khanna and H. Kalant. "Role of Pavlovian Conditioning in the Development of Tolerance and Cross-tolerance to the Hypothermic Effect of Ethanol and Hydralazine." *Psychopharmacology* 1987; 92: 210-214.
- Lê, A.D., J.M. Khanna, H. Kalant and F. Grossi. "Tolerance to and Cross-tolerance Among Ethanol, Pentobarbital and Chlordiazepoxide." *Pharmacology Biochemistry and Behavior* 1986; 24: 93-98.

**Biobehavioural Research (Social and Biological Studies Division)**

**Investigators:** J.M. Khanna, A.D. Lê and H. Kalant

**56**

### **Pharmacological, Behavioural and Genetic Factors in the Development of Alcohol and Drug Tolerance**

Tolerance and physical dependence are two consequences of chronic intake of drugs that are believed to contribute to the strength of addiction. Work in ARF and other laboratories has shown that tolerance is not simply a consequence of drug exposure (pharmacological), but can be influenced by environmental, behavioural and genetic factors.

#### **Research**

The objective of this research program is to study how pharmacological, behavioural and genetic factors interact in regulating tolerance development.

It has been shown that, at a given level of alcohol exposure, tolerance develops to different extents in different behaviours and physiological functions, depending on the degree to which each is functionally impaired by the drug. This in turn depends on genetic differences in initial sensitivity, on the degree of opportunity for the subject to practise the test performance while intoxicated, and on the opportunity for Pavlovian conditioning between drug exposure and specific environmental cues. Behavioural and environmental factors are critical for the manifestation of alcohol tolerance when a low treatment dose of alcohol is employed.

It has also been found that Pavlovian conditioning might affect alcohol tolerance by delaying the entry of alcohol into the central nervous system. Finally, it has been found that the capacity to acquire tolerance to alcohol might be a critical factor in

determining the preference for alcohol: rats genetically selected for high alcohol preference show better capacity to develop tolerance than those with low preference.

Studies are now aimed at determining the interaction among the factors mentioned above in the development of tolerance to other drugs of abuse such as barbiturates and benzodiazepines.

#### **Implications**

The relationship of tolerance to physical dependence and to continued drug intake is of fundamental importance in addiction. It can be examined much more thoroughly once the interaction among pharmacological, behavioural and genetic factors in tolerance to alcohol and other drugs is systematically defined. Accurate and detailed knowledge about tolerance and its relations to drug use would facilitate the development of rational measures for treatment of alcohol addiction and relapse.

#### **Selected Publications**

- Kalant, H. "Drug Tolerance and Sensitization - A Pharmacological Overview", In *Tolerance and Sensitization to Psychoactive Drugs*, eds. Goudie, A.J. and M.W. Emmett-Oglesby. Humana Press, Clifton, N.J., forthcoming.
- Lé, A.D., H. Kalant and J.M. Khanna. "Effects of Treatment Dose and Intoxicated Practice on the Development of Tolerance to Ethanol-induced Motor Impairment." *Alcohol and Alcoholism* 1987; Supplement 1: 435-439.
- Lé, A.D. and J.M. Khanna. "Dispositional Mechanisms in Drug Tolerance and Sensitization." In *Tolerance and Sensitization to Psychoactive Drugs*, eds. Goudie, A.J. and M.W. Emmett-Oglesby. Clifton, New Jersey: Humana Press, forthcoming.
- Lé, A.D., J.M. Khanna and H. Kalant. "Role of Pavlovian Conditioning in the Development of Tolerance and Cross-tolerance to the Hypothermic Effects of Ethanol and Hydralazine." *Psychopharmacology* 1987; 92: 210-214.

- San-Marina, A. "The Relationship Between Initial Sensitivity and Acquired Tolerance to Ethanol Hypothermia." Master's thesis, University of Toronto, 1987.

#### **Grants**

Work in this program is supported by a grant from the U.S. National Institute of Alcohol Abuse and Alcoholism (NIAAA).

#### **Biobehavioural Research (Social and Biological Studies Division)**

**Investigators:** J.M. Khanna, A.D. Lé and H. Kalant

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### **Clinical Pharmacology of Tobacco Dependence**

Nicotine is the drug in tobacco responsible for the pharmacological control of smoking behaviour, although many social and psychological factors are also involved. A set of research tools has been developed to aid in determining the exact role of nicotine in this dependence disorder. These include micro-aerosol generators, chemical techniques for measuring minute quantities of nicotine and its metabolites in blood and various body tissues, and a number of physiological and behavioural techniques for measuring nicotine withdrawal.

#### **Research**

Two lines of research are currently active:

1. The impact of cigarette technology on yield and smokers' constituent doses is being investigated in the Tobacco Science Laboratory. Analysis is both under standard conditions (of temperature, humidity, puffing rate and butt length) and under nonstandard conditions that represent reasonable analogues of physiological variation. Also, in the Clean Air Laboratory, blood, urine and other samples are analyzed for content of nicotine, cotinine and other substances using gas liquid chromatographic



J.M. Khanna

and other techniques. This data pertains to studies conducted to investigate further the pharmacology of tobacco dependence and related phenomena that contribute to the problematic (dangerous) use of tobacco.

2. In collaboration with the Institute of Biomedical Engineering (University of Toronto), a new method for precise measurement of human eye movements has been developed (see Research Entry #64). This system is used in the Human Responses Laboratory of the Clinical Institute to evaluate the effects of tobacco (and relevant associated drugs) on central nervous system function during acute and chronic administration, and during withdrawal. It is hoped that this will yield a better understanding of the neuropharmacological basis of tobacco dependence and its interrelationship to the use of other drugs.

These technologies have been incorporated into a number of clinical trials of new pharmacotherapies for smoking cessation. In 1988 one of these trials will be completed and another started. Two others will be initiated in 1989.

### Implications

By developing a sound mechanistic understanding of tobacco dependence, more effective methods for the identification and treatment of individuals dependent on tobacco can be developed and demonstrated.

### Selected Publications

- Bendayan, R., J. Sullivan, C. Shaw, R.C. Frecker and E.M. Sellers. "Effect of H<sub>2</sub>-receptor Antagonists on Nicotine Disposition." [Abstract] *Clinical Pharmacology and Therapeutics* 1988; 43: 124.
- Frecker, R.C. and J.E. Lux. "Differences in Cardiovascular Responses to Inhaled and Intravenous Injected Nicotine." [Abstract] *Clinical Pharmacology and Therapeutics* 1988; 43: 143.
- Lux, J.E. and R.C. Frecker. "Subjective

Responses to Inhaled and Intravenous Injected Nicotine." [Abstract] *Clinical Pharmacology and Therapeutics* 1988; 43: 186.

### Grants

Work in this program is financially supported by Lilly Research Laboratories (Indiana, U.S.) and Glaxo Group Research (England).

**Biomedical Research (Clinical Institute Division)**, in collaboration with the Institute of Biomedical Engineering, University of Toronto  
**Investigator:** R.C. Frecker

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### Pavlovian Conditioning

Tolerance and physical dependence are two consequences of chronic drug use that have received considerable attention in biological and behavioural theories of addiction. For a number of years, work in this program has concentrated on the hypothesis that many aspects of tolerance and dependence can be accounted for by well-established principles of conditioning and learning, namely those associated with Pavlov.

The hypothesis for this research is that the physiological, chemical, and behavioural responses involved in tolerance and dependence can be brought under the control of environmental stimuli through predictable and controllable learning processes. More recently, this approach has taken an unanticipated direction and led to studies in animals of how brain chemicals (those related to opiates and benzodiazepines) are affected by learning during chronic drug treatment, and how these chemicals and learning may contribute to tolerance and dependence.

### Research

From 1986 to 1988, this research has undergone a change of direction. The investigations on Pavlovian conditioning of tolerance and dependence concluded with studies that demon-

strated a pervasive influence of learning processes across different addictive drugs, different response systems, and a variety of environmental stimuli, including those stimuli created by drug administration per se.

In the course of testing the application of the Pavlovian model to morphine, an unexpected discovery was made. Naloxone is an opiate antagonist and, as such, it should block the effects of opiates such as morphine. It should not have any effects of its own and, if it does, they should be effects opposite to those of opiates. The tests showed that, contrary to expectation, when naloxone is administered repeatedly, it produces analgesia, an effect expected from opiates but not from antagonists. This led to the hypothesis that there is a backup opiate system (or systems) in the brain that can be called into play when the normal system for responding to pain is blocked by an antagonist. Moreover, this system is subject to conditioning, as was found for tolerance to a variety of drugs. And finally, preliminary results suggest that the backup system for opiates may be linked in some way to natural benzodiazepine systems in the brain.

### Implications

These results are an exciting challenge to existing conceptions of how the brain responds to chronic exposure to drugs. The most general implication, which had already been suggested in other work, is that addictive processes are based on natural substances in the brain that are closely related to the natural and synthetic substances to which some people become addicted. These natural substances are also closely linked to a number of phenomena (e.g., stress) that are believed to play an important role in addiction.

Future research in this program will investigate these systems more fully, especially as underpinnings for addiction. Work will concentrate on interactions among the opiate and benzodiazepine systems, and how these in turn are affected by other addictive drugs (e.g., alcohol) for which the relation to these systems is not clear. Another direction will be the involvement of genetic factors in these processes, as it is known that there are large individual differences at play. For example, the analgesic responses of some rats are much more affected by chronic treatment with naloxone than others. Perhaps susceptibility or resistance to this effect is related to addictive vulnerability.



H. Cappell

#### Selected Publications

- Greeley, J.D., A.D. Lé, C.X. Poulos and H. Cappell. "Paradoxical Analgesia Induced by Naloxone and Naltrexone." *Psychopharmacology* 1988; 96: 36-39.
- Hinson, R.E., C.X. Poulos, W. Thomas and H. Cappell. "Pavlovian Conditioning and Addictive

Behaviour: Relapse to Oral Self-administration of Morphine." *Behavioral Neuroscience* 1986; 100: 368-375.

•Hunt, T., C.X. Poulos and H. Cappell. "Benzodiazepine-induced Hyperphagia: A Test of the Hunger-mimetic Model." *Pharmacology Biochemistry and Behavior* 1988; 30: 515-518

•Poulos, C.X., T. Hunt and H. Cappell. "Tolerance to Morphine Analgesia is Reduced by the Novel Addition or Omission of an Alcohol Cue." *Psychopharmacology* 1988; 94: 412-416.

#### Grants

This work is supported by a grant from the Natural Science and Engineering Research Council of Canada.

**Biobehavioural Research (Social and Biological Studies Division)**, in collaboration with Sociobehavioural Research (Clinical Institute Division)

**Investigators:** H. Cappell and C.X. Poulos, with A.D. Lé

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#### Neurochemical Mechanisms of Tolerance to Alcohol and Other Drugs

It is generally accepted that tolerance to ethanol and other psychoactive drugs involves adaptive changes in the membranes of nerve cells, that render the cells less sensitive to the effects of the drugs. However, many different changes in physical and chemical properties have been found in membranes from tolerant animals. It is not clear which ones produce the tolerance and which are merely manifestations or consequences of the tolerance. This is an important issue. Tolerance is believed to contribute significantly to the strength of dependence on a drug. Knowledge of how to prevent or reverse tolerance could be of clinical importance in treating dependence.

This program is aimed at identifying those processes and chemical features of cell membranes that are most directly linked to the production of tolerance. In addition, since earlier work at the Foundation has shown that tolerance is markedly affected by learning and environmental factors (see Research Entry #56), neurochemical changes that might explain the influence of these factors are of special interest.

#### Research

Much previous effort in this laboratory has been devoted to the study of tolerance in cell membrane biochemical processes, especially in the activity of the enzyme ( $\text{Na}^+ + \text{K}^+$ )-ATPase. The effect of alcohol on this enzyme was greatly enhanced by noradrenaline, a chemical messenger in the brain. Recent work in this area has involved a detailed examination of

the effects of the experimental conditions on this interaction of alcohol, noradrenaline and ATPase. This work has disclosed a previously unrecognized influence of several substances, used in the measurement of the ATPase activity, on the noradrenaline effect.

Vasopressin, a hormone released by the pituitary gland, has been shown to preserve newly developed tolerance to alcohol and to chlordiazepoxide (Librium<sup>®</sup>) after the administration of these drugs has been discontinued, when the tolerance would have otherwise disappeared. This action of vasopressin requires the cooperation of another chemical messenger, serotonin, in a particular part of the brain (the hippocampus) that plays a major role in learning and memory. However, vasopressin failed to affect the duration of alcohol tolerance that was acquired by intensive training under alcohol within a single day (rapid tolerance). In contrast, both rapid tolerance and gradually acquired tolerance were prevented by injection of a substance, anisomycin, that prevents the synthesis of new protein in the brain. This shows that both forms of tolerance require the synthesis of new protein.

Another chemical messenger, related to the opiate drugs, is beta-endorphin, a natural substance found in certain parts of the brain that plays a role in the reinforcement of alcohol and drug self-administration. Studies have been completed showing that tolerance to alcohol is accompanied by an increase in the rate of synthesis of endorphin, and the withdrawal reaction is associated with a sudden fall in the concentration of endorphin in certain parts of the brain.

When vasopressin acts on its specific binding sites on the cell surface, it activates a series of chemical reactions in the membrane and in the interior of the cell, known as the phosphatidylinositol (PI) cycle. This PI cycle is called a second messenger system. It in turn causes further changes in the channels through which calcium and other substances pass across the cell membrane to the interior of the cell, and thus alters the excitability of the cell. It has been found that, in brain tissue from alcohol-tolerant rats, the effect of vasopressin on the PI cycle is much reduced.

### Implications

It is not yet certain that the alterations in vasopressin and endorphin activity are the mechanisms of tolerance, rather than manifestations of it. There are plans to examine other cell membrane constituents that are known to be very sensitive to the effects of alcohol, and to show changes in the tolerant animal. The most important of these constituents is the complex of proteins to which the chemical messenger GABA and the benzodiazepine drugs such as diazepam (Valium®) attach and cause an increase in the movement of chloride ion across the cell membrane. For this purpose a machine has been constructed that permits the measurement of chloride across the membrane in periods as short as 10 milliseconds (10 one-thousandths of a second). Changes in this complex will be studied, as well as in the PI cycle and other second messengers, during the action of alcohol and other drugs, and the development of tolerance to them. Clarification of these changes would offer specific targets for attempts to reverse tolerance by therapeutic use of other drugs, in an

attempt to reduce the extent of drug intake by addicted humans.



H. Kalant

### Selected Publications

- Campanelli, C., A.D. Lê, J.M. Khanna and H. Kalant. "Effect of Raphe Lesions on the Development of Acute Tolerance to Ethanol and Pentobarbital." *Psychopharmacology*, in press.
- Gianoulakis, C., W.D. Hutchinson and H. Kalant. "Effects of Ethanol Treatment and Withdrawal on Biosynthesis and Processing of Pro-opiomelanocortin by the Rat Neurointermediate Lobe." *Endocrinology* 1988; 122: 817-825.
- Khanna, J.M., C. Campanelli, A.D. Lê and H. Kalant. "Effect of Raphe Lesions on the Development of Chronic Tolerance to Pentobarbital and Cross-tolerance to Ethanol." *Psychopharmacology* 1987; 91: 473-478.
- Speisky, M.B. and H. Kalant. "Retention of Ethanol Tolerance by Desglycinamide-arginine-vasopressin Occurs in the Absence of Changes in Hippocampal Serotonin Synthesis." *Alcohol and Alcoholism* 1987; Suppl. 1: 455-459.

### Biobehavioural Research (Social and Biological Studies Division)

**Investigators:** H. Kalant, J.M. Khanna and A.D. Lê

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### Neurobehavioural Effects of Alcohol in Different Age Groups

As people get older they tend to have less tolerance to the behavioural effects of alcohol. The objectives of this research program are to assess the acute effects of moderate doses of alcohol, including the development of acute tolerance to alcohol in adults of different age groups. Special consideration will be given to a comparison of older and younger adults.

### Research

A variety of cognitive and neurophysiological tests have been developed that are sensitive to the effects of alcohol. These indices will be measured repeatedly during the

course of alcohol administration, and for a few hours thereafter. Blood alcohol concentrations below the lower limits of legal impairment (50 mg or 0.05 per cent) will be achieved. The rate of development of tolerance to the administered drug will then be measured. The relationship of the degree of impairment to increasing age will be examined. Later, drugs which can modify or block alcohol intoxication will be tested.

### Implications

Knowledge of differential responses to the same dose of alcohol among different age groups has a number of implications. For example, such knowledge could have significance in the setting of blood alcohol levels considered acceptable (legal) for driving.

### Selected Publications

- Carlen, P.L. and C.E. Niesen. "Alcohol Pharmacokinetics and Pharmacodynamics in the Elderly: Animal and Human Studies." *Proceedings of the Society for Toxicology of Canada*, 1988: 184-187.
- Niesen, C.E., A. Baskys and P.L. Carlen. "Reversed Ethanol Effects on Potassium Conductances in Aged Hippocampal Dentate Granule Neurons." *Brain Research* 1988; 445: 137-141.

### Biomedical Research (Clinical Institute Division)

**Investigators:** P.L. Carlen, with C.X. Poulos, N. Noldy, J. Neiman and H. Kaplan

## Damage to Vital Organs

**61**

### Alcohol-induced Liver Dysfunction and Disease

The broad objective of this ongoing research program is to increase the understanding of physiological damage resulting from hazardous patterns of alcohol use. Specific objectives are to contribute to a better understanding of the mechanisms that produce or enhance alcoholic liver damage, with the aim of improving treatment for this condition.

#### Research

Three lines of research currently make up this program:

1. Immunological Mechanisms: Investigators are testing the hypothesis that the antibodies against acetaldehyde adducts (recently discovered by researchers in this program) can produce liver disease, likely by potentiating the hypoxic alcohol-induced liver disease. Studies in alcoholics have extended the observations and the scope of findings in animals. The animal studies demonstrated that chronic alcohol consumption leads to the production of antibodies that can recognize products of alcohol metabolism, such as acetaldehyde protein adducts. Acetaldehyde protein adducts are found in the membrane of the liver cells. The investigators have proposed that the anti-acetaldehyde-adduct antibodies produced in the body attack the liver cells, now mistaken as foreign, in a search-and-destroy function.

Future directions of this research will see the development of an animal

model of alcoholic liver disease of immunologic nature, which may lead to the use of immunosuppressants as an adjunct to the use of propylthiouracil in the treatment of alcoholic liver disease.

2. Glutathione (Hepatoprotection) Reduction Mechanisms: It is widely known that the elevated levels of the enzyme gamma-glutamyl transferase in liver and plasma of alcoholics provide one of the most effective markers of excessive alcohol consumption. It was previously believed that such an increase in enzyme levels was a sign of liver damage, but investigators have now shown that the mechanism is different. Specifically: (a) alcohol depletes the hepatoprotective agent glutathione, which is washed out from the liver, and (b) the liver synthesizes more of the enzyme gamma-glutamyl transferase to help this organ recover the hepatoprotective precursor substances from the bloodstream. The investigators showed that this is a general mechanism by which the liver responds to a drop in the levels of glutathione. Thus, devising interventions to increase the amount and function of gamma-glutamyl transferase in the liver may lead to better protection against liver damage.

3. Hepatoprotection by Increasing Liver Blood Flow: These studies, in collaboration with Gastroenterology Research (see Research Entry #103) are investigating earlier findings from the Biochemical Research Program concerning the mechanism(s) by which alcohol increases hepatic blood flow. It has been shown recently that the effect of ethanol in increasing portal blood flow is mediated by the purinergic system.

#### Implications

About one-third of the excess mortality associated with alcoholism is due to alcohol-induced liver disease, including alcoholic cirrhosis. About 1000 to 2000 people die each year in Ontario alone of alcohol-induced liver disease. Earlier animal work led to the finding of the protective effects of PTU in the liver. It is expected that the present studies will lead to other therapies to be used in conjunction with PTU.



Y. Israel

#### Selected Publications

- Israel, Y. and H. Orrego. "Hypermetabolic State, Hepatocyte Expansion and Liver Blood Flow: An Interaction Triad in Alcoholic Liver Injury." In *Alcohol and the Cell*, ed. Rubin, E. Annals of the New York Academy of Sciences 1987; 492: 303-323.
- Israel, Y., H. Orrego and O. Niemelä. "Immune Responses to Alcohol Metabolites: Pathogenic and Diagnostic Implications." *Seminars in Liver Disease* 1988; 18: 81-90.

•Niemela, O., F. Klajner, H. Orrego, E. Vidins, L. Blendis and Y. Israel. "Antibodies Against Acetaldehyde-modified Protein Epitopes in Human Alcoholics." *Hepatology* 1987; 7: 1210-1214.

•Speisky, H., A. Gunasekara, G. Varghese and Y. Israel. "Basolateral Gamma-glutamyl Transferase Ectoactivity in Rat Liver: Effects of Chronic Alcohol Consumption." *Alcohol and Alcoholism* 1987; Suppl. 1: 245-249.

#### Grants

This work is supported by grants from the Medical Research Council of Canada and the U.S. National Institute of Alcohol Abuse and Alcoholism.

#### Biochemical Research (Social and Biological Studies) and the Clinical Institute Division

**Investigators:** Y. Israel, with O. Niemelä, H. Orrego and E. Vidins

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## Alcohol- and Drug-induced Brain Dysfunction: Natural History, Pathogenesis and Treatment

Acute and chronic alcohol- and drug-induced brain dysfunction are common problems among alcohol abusers. This research program involves ongoing clinical and laboratory studies that are looking into the natural history and pathogenesis of alcohol- and drug-induced brain dysfunction. The aim is the early identification of subjects at risk for drug-induced brain dysfunction by researching mechanisms of acute intoxication, drug withdrawal phenomena and chronic brain damage.

### Research

Laboratory studies are concerned with the ionic mechanisms associated with acute intoxication, drug-withdrawal convulsions, and drug-induced brain damage. In 1987 a double-blind cross-over placebo-controlled study of the nontropic drug oxiracetam was instituted in the treatment of alcoholic dementia.

Laboratory experiments show that acute application of alcohol has inhibitory effects in young naive neurons and disinhibitory effects in old neurons. The neuronal ionic mechanisms of the neurotransmitter serotonin are complex and involve the movement of potassium ions. These actions are enhanced by alcohol. Alcohol has been shown to block calcium currents in neurons when acutely applied. However, in an *in vitro* model of alcohol-withdrawal epilepsy, alcohol withdrawal resulted in increased calcium currents. An *in vitro* model of benzodiazepine-

withdrawal epilepsy has also been established. The evidence suggests that prolonged administration of sedative-hypnotic drugs can create a hyperexcitable state in the brain that is unmasked during drug withdrawal.

Clinical studies are exploring new ways of assessing brain excitability and measuring encephalopathy using evoked potentials and computerized EEG with brain mapping. The results of a long-term study of the reversibility of alcoholic brain damage are being analyzed. Changes in brain density and volume have been documented along with improved neuropsychological scores, which suggest that recovery is possible in some cases of alcohol-induced brain damage.

### Implications

Early identification of alcohol and drug problems is an important component in the provision of effective treatment. An understanding of the cellular ionic pathogenesis and clinical, electrophysiological and biochemical concomitants of alcohol- and drug-induced brain dysfunction will contribute to early identification.



P.L. Carlen

### Selected Publications

- Baskys, A., C.E. Niesen and P.L. Carlen. "Altered Modulatory Actions of Serotonin on Dentate Granule Cells of Aged Rats." *Brain Research* 1987; 419: 112-118.
- Blaxter, T.J. and P.L. Carlen. "Measurements of Dendritic Conductance Changes to GABA in Granule Cells of the Rat Dentate Gyrus." *Neuroscience* 1988; 24: 821-827.
- Blaxter, T.J. and P.L. Carlen. "GABA Responses in Rat Dentate Granule Neurons are Mediated by Chloride." *Canadian Journal of Physiology and Pharmacology* 1988; 66: 637-647.
- Carlen, P.L. "Alcoholic Brain Disease and the Wernicke-Korsakoff Syndrome." *Current Opinion in Neurology and Neurosurgery* 1988; 1(3): 372-376.
- Carlen, P.L. and P.H. Wu. "Calcium and Sedative-hypnotic Drug Actions." *International Review of Neurobiology* 1988; 29: 161-189.

*Neurobiology* 1988; 29: 161-189.

- Davies, M.F., S.E. Sasaki and P.L. Carlen. "Benzodiazepine-induced Epileptiform Activity *In Vitro*." *Brain Research* 1988; 437: 239-244.
- O'Beirne, M., N. Gurevich and P.L. Carlen. "Pentobarbital Inhibits Hippocampal Neurons by Increasing Potassium Conductance." *Canadian Journal of Physiology and Pharmacology* 1987; 65: 36-41.

- Reynolds, J., A. Baskys and P.L. Carlen. "Serotonin Enhances Neuronal Responses to NMDA in Rat Neocortical Neurons." *Brain Research* 1988; 452: 286-292.
- Rush, P.J., R. Imman, M. Bernstein, P.L. Carlen and L. Resch. "Isolated Vasculitis of the Central Nervous System in a Patient with Celiac Disease." *American Journal of Medicine* 1987; 81: 1092-1094.

### Grants

Work in this program is supported by the Ontario Mental Health Foundation, the Alcoholic Beverage Medical Research Foundation, the Medical Research Council of Canada, Ciba-Geigy, the Hospital For Sick Children and the Edward Christie Stevens Fellowship, as well as a number of ARF student support awards.

### Biomedical Research (Clinical Institute Division)

**Investigators:** P.L. Carlen, with D.A. Wilkinson and B.M. Kapur

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## Portal Systemic Encephalopathy

Alcoholics commonly have liver disease, which can be associated with brain damage characterized by mental impairment ranging from subtle dysfunction to coma. The objective of this ongoing research program is to study the pathophysiology of Portal Systemic Encephalopathy (PSE) with a view to detecting subclinical cases and improving treatment.

### Research

Psychophysiological and biochemical measures are being made in patients with PSE before and after recovery, as well as in patients suspected of having PSE. It is hypothesized that alterations in the blood-brain barrier are a major cause of PSE. Concomitant

animal studies to test this hypothesis are also being performed.

An animal study showed that serum ultrafiltrate from patients with PSE, when injected into the ventricles of rabbits, caused EEG slowing. Saline solution did not have this effect. These results suggest that PSE could be due to a breakdown in the blood-brain barrier.

### Implications

Future directions of this program will see the addition of MRI scanning in the assessment of PSE patients. Earlier detection of mental impairment associated with excessive alcohol use will permit more effective interventions to be made.

#### Selected Publications

- Carlen, P.L. and D.A. Wilkinson. "Alcohol-induced Brain Damage: Confounding Variables." *Alcohol and Alcoholism* 1987; Suppl. 1: 37-41.

#### Biomedical Research (Clinical Institute Division)

**Investigators:** P.L. Carlen, with E. Vidins, H. Orrego and P. Stewart

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### Eye Movements and Alcohol-related Brain Damage

The chronic overuse of alcohol has been shown to damage the brain. One manifestation of this damage is a disturbance in the control of eye movements. In advanced brain damage, abnormal to-and-fro movements of the eyes can be seen when a person looks to the left or the right. There is good reason to believe that it would be possible to detect oculomotor (eye movement) abnormalities at a much earlier stage with sensitive instrumentation, and possibly to identify persons at particular risk of brain damage associated with overuse of alcohol.

Novel high-precision instrumentation has been developed by the principal investigator at the University of Toronto for sensitive noninvasive measurement of the effects of nicotine and other psychoactive drugs on the human brain. The present project represents an extension of the use of this technology to the area of diffuse cortical damage.

### Research

In collaboration with the Neurology Program, the objective of this new research program is to study the effects of acute and chronic alcohol administration on the oculomotor control system, and thereby on central nervous system function and integrity. Analysis of experimental data will suggest which oculomotor parameters are most sensitive to early (subclinical) brain damage, and correlate best with the psychometric indices of impaired function which have been included. The intention is to develop more sensitive and quantitative measures of the brain damage associated with alcohol consumption.

Subjects' eye movements are elicited by various computer-controlled moving visual targets. The target positions are calculated mathematically and presented on a precision oscilloscope, or through a servo-controlled laser projector. The position of the eye is calculated 1,000 times each second with a high degree of precision (20 seconds of rotational arc). Eye position coordinates are sent to the controlling computer as they are generated, and are analyzed by specially developed software.

A wide variety of stimuli can be used, and each eye movement is analyzed for delay, duration, velocity and accuracy. The analysis process has been automated, and it is now

possible to analyze the data from many patients in a short period. Preliminary investigations began in 1987, but the critical research (as opposed to the instrumentation development) is in an early stage.

### Implications

An early objective indicator of CNS damage would prove useful in the early identification of susceptible individuals, for whom a more aggressive and earlier intervention may be deemed therapeutically appropriate.

#### Selected Publications

- Frecker, R.C. and W.J. MacLean. "Mathematical Approaches to Modelling the Oculomotor Control System." *The Mathematical Scientist*, in press.
- Hassenein, K. *Modelling of the Oculomotor System in Patients With Myasthenia Gravis.*" Master's thesis, Department of Electrical Engineering, University of Toronto, 1986.
- Mittal, S. "Envelope Correlation Detector for Estimating Human Visual Acuity Using Evoked Potential." Master's thesis, Department of Electrical Engineering, University of Toronto, 1986.

#### Grants

Work in this program is supported by grants from the Natural Sciences and Engineering Research Council of Canada.

#### Biomedical Research (Clinical Institute Division)

in collaboration with the Institute of Biomedical Engineering, University of Toronto

**Investigators:** R.C. Frecker with P.L. Carlen

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### Neuropsychological Aspects of Drug-related Organic Brain Syndromes: Reversible Organic Brain Syndrome Study (ROBSS)

Heavy alcohol consumption is associated with demonstrable brain damage and cognitive impairments which, in some cases, are partially reversible under conditions of abstinence. Within this program of research, an attempt is made to delineate those aspects of alcohol-

related cognitive impairments in which recovery is observed.

#### **Research**

A study has been conducted in which the level of cognitive impairment of alcoholics is assessed during the first week of abstinence from alcohol and reassessed three weeks later. The test battery taps the cognitive domains of verbal skill, memory and learning, abstracting, and perceptual-motor coordination. The study is designed so that practice effects can be analyzed separately from recovery.

The results indicate that practice effects are observed in all areas except verbal skill, and that major effects of recovery are especially apparent in the area of perceptual-motor coordination. These changes will be related to neurological and neuroradiological findings from other aspects of the program (see Research Entry #62).

#### **Implications**

Understanding the nature and extent of cognitive recovery in alcoholics is valuable for planning the timing and components of treatment programs for this population. In addition, this work furthers basic scientific understanding of human neuropsychology. The estimated date for completion is 1989.



D.A. Wilkinson

**Selected Publications**

- Wilkinson, D.A. "CT Scan and Neuropsychological Assessments of Alcoholism." In *Neuropsychology of Alcoholism: Implications for Diagnosis and Treatment*, eds. Parsons, O.A., N. Butters and P. Nathan. New York: Guilford Press, 1987: 76-102.

#### **Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** D.A. Wilkinson, with P.L. Carlen, L.R. Goldhar, L. Fornazzari and J.M. Bennett

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#### **Assessment of Memory Problems in Alcoholics and Drug-dependent Persons**

Chronic alcohol abuse can result in relatively permanent memory impairments. These impairments, however, do not simply involve a global reduction in learning and retention. Rather, they seem to involve a circumscribed type of memory impairment. The present research is looking at the cognitive impairment caused by chronic alcohol abuse and assessing impairments which may result from chronic abuse of benzodiazepines, cocaine and other drugs.

#### **Research**

On the basis of earlier studies in the department and other facilities, a two-process theory of memory has been developed. In alcoholics one of these processes seems particularly vulnerable, and in extreme cases damage to this memory system results in the clinical condition of Korsakoff amnesia. It is proposed that damage to this memory system can be of varying degrees, all of which tend to be manifested in the alcoholic population.

#### **Implications**

This theoretical formulation yields clear, testable predictions about the ways in which alcoholics will be impaired or normal on various tests of memory. This model is being assessed in alcoholics and will be evaluated in cocaine users also.

#### **Selected Publications**

- Wilkinson, D.A. and C.X. Poulos. "The Chronic Effects of Alcohol on Memory: A Contrast Between a Unitary and Dual System Approach." In *Recent Developments in Alcoholism*, ed. Galanter, M. New York: Plenum Publishing Corporation, 1987; 5: 5-25.

#### **Sociobehavioural Research (Clinical Institute Division)**

**Investigator:** C.X. Poulos

**67**

#### **Prevalence and Incidence of HIV-1, HIV-2 and HTLV-1 Infections in Injection Drug Users in Toronto and Montreal**

The available evidence suggests that there are currently between 50,000 and 100,000 Injection Drug Users (IDUs) in Canada, mainly in the metropolitan areas of Montreal, Toronto and Vancouver. Members of the IDU group, who are potentially at risk of HIV infection, constitute the major source of spread to the non-drug-using community through sexual partners and perinatal transmission. Despite the existence of these significant numbers of IDUs in Canada, only 0.4 per cent of the Canadian cases of AIDS have been heterosexual IDUs. To date, no satisfactory prevalence studies (proportion of IDUs infected) and no incidence studies (occurrence of new cases) of HIV infection in IDUs have been carried out in Canada. However, in two limited surveys of IDUs in Vancouver and Montreal, the prevalence of HIV antibodies was low, 1.3 per cent and 4 per cent respectively.

#### **Research**

A series of studies in Toronto and Montreal is proposed to determine the prevalence, incidence and factors influencing the development of human immunodeficiency virus infection in injection drug users in Canada, including observations of ways in which transmission of this infection can be prevented in this group.

#### **Implications**

Future directions of this research program will see the implementation of the seroprevalence and incidence study, subject to approval of Health and Welfare Canada funding, and

collaboration in the WHO program of research into HIV infection and injection drug use.

#### Selected Publications

- Rankin, J.G. "Nonmedical Use of Psychoactive Drugs and Infection with Human Immunodeficiency Viruses." In *AIDS: A Handbook for Professionals*, eds. Snowden, D. and D. Cassidy. Toronto: Carswell Publications, 1988.

#### Grants

This work is supported by a grant from the National Health Research and Development Program, Health and Welfare Canada.

#### Biomedical Research (Clinical Institute Division)

**Investigators:** J.G. Rankin, R. Coates (Toronto), F. Lamothe and J. Bruneau (Montreal), with P. Devenyi, T. Franklin (Toronto), M. Brabant, J. Soto, J. Vinclette and M. Fauvel (Montreal)

## 68

### Development of Improved Methods for Analysis of Drugs in Body Fluids and Tissues

Many drugs act in the nervous system to produce such effects as reinforcement, intoxication, tolerance, brain damage, etc. To study the mechanisms of this action in detail it is necessary to measure the tissue concentrations of the drugs themselves, as well as of neurotransmitters, neuropeptides and other tissue constituents, at various times after drug administration or self-administration. Since most of the drugs are potent, and the relevant doses are therefore very small in absolute terms, suitable analytical methods must be very sensitive, specific and accurate. Methods based on high-performance liquid chromatography (HPLC) or gas chromatography combined with mass spectrography (GC-MS) are usually the most suitable.

Using chromatographic techniques, the objective of this research is to

develop improved methods of analysis for measuring concentrations of psychoactive drugs and their metabolites in very small samples of brain, blood and other tissues and fluids of experimental animals.

#### Research

A simple and sensitive HPLC method was developed for the determination of biogenic amines in the rat brain. The method was applied in an examination of the effects of psychoactive drugs on the concentrations of biogenic amines, as a means of validating the specificity and sensitivity of this new analytical technique.

In conjunction with the Department of Psychology, University of Western Ontario, and the Psychology Department, Clinical Institute, biogenic amines in samples from discrete regions of rat brain are being analyzed to study neurochemical mechanisms in contingent tolerance to central stimulants and tranquilizers.

A simple and sensitive gas chromatographic method was developed for the determination of central depressants (barbital and pentobarbital) in blood. The method is being used for studies on mechanisms of tolerance to alcohol and barbiturates.

The assays for long-acting opiate receptor blocking agents (naltrexone and methylnaltrexone) are being tested on brain tissue and serum samples to measure the distribution of antagonists in microdissected brain tissue after intracranial infusions of the magnitude used in mapping reinforcement sites. In order to assess the effects of the various experimental procedures and drug treatments, it is necessary to measure minute quantities of the drugs in very small brain tissue samples and biological fluids. A simple and

sensitive HPLC method was developed for the measurement of naltrexone and methylnaltrexone in rat brain regions and serum. The work in this program will be used in the studies on mechanisms of reinforcement of self-administration of heroin by the rat.

#### Implications

The focus for 1988-1989 will be to establish a method for the determination of neuropeptides, in order to study the possible role of endorphins and of the small but related morphine-like peptides (enkephalins) in the normal functions of the brain, and in its acute and chronic responses to opiates and alcohol.

#### Selected publications

- Kim, C., R. Berg and J.M. Khanna. "Rapid and Sensitive Gas Chromatographic Method for Detection of Barbital and Pentobarbital in Blood Using Flash-heater Methylation and Nitrogen-specific Detection." *Chromatographia* 1987; 23: 269-272.



C. Kim

- Kim, C., R. Cheng and W.A. Corrigan. "Measurement of Naltrexone in Rat Brain Regions and Serum by High Performance Liquid Chromatography with Electrochemical Detection." *Chromatographia* 1988; 25: 91-94.

- Kim, C., M.B. Speisky and S.N. Kharouba. "Rapid and Sensitive Method for Measuring Norepinephrine, Dopamine, 5-Hydroxytryptamine and Their Metabolites in Rat Brain by HPLC: Differential Effect of Probenecid, Haloperidol and Yohimbine on the Concentrations of Biogenic Amines and Metabolites in Various Regions of Rat Brain." *Journal of Chromatography* 1987; 386: 25-35.

#### Biobehavioural Research (Social and Biological Studies Division)

**Investigator:** C. Kim

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## The Effects of Cigarette Withdrawal on Decision-making Processes

It is common to experience difficulty in concentrating for at least 10 days after quitting smoking. The impairment is severe enough to affect job performance, and stress exacerbates withdrawal symptoms. Thus, in jobs that require concentration, stressful situations are likely to affect smokers in withdrawal sufficiently to increase the concentration impairment, thereby promoting relapse. Little is known about the underlying causes of this concentration impairment, but research from other laboratories suggests that it is related to deficits in decision making. Research in ARF laboratories has found similar impairments in studies of the cognitive effects of diazepam. In this tobacco withdrawal study, techniques similar to those used to investigate the cognitive effects of diazepam are being used.

### Research

A pilot study on the cognitive effects of nicotine withdrawal was completed in 1988. A repeated-measures experimental design was used to compare the performance of smokers who were smoking to their performance in cigarette withdrawal. This study produced promising results. Normal cognitive performance requires making correct decisions amidst incorrect alternatives (the suppression of competing associations). Cigarette withdrawal impaired the suppression of competing associations, resulting in more incorrect decisions. This work is currently being replicated with more subjects, longer periods of abstinence,

and more sensitive cognitive measures.

### Implications

There are several implications and follow-up questions which arise from this research.

Alcohol, diazepam and tobacco withdrawal produce impairments in driving performance, which are related to the decision-making deficits observed in this laboratory. This will be followed up with more detailed studies in driving simulators.

Tasks that measure the suppression of competing associations seem to be particularly sensitive in a wide range of drugs, at low levels of impairment. These cognitive functions are also closely related to everyday human functioning. This research promises to be of value in studying many forms of drug-induced brain impairment.

Further work will be done in the study of the relationships between the decision-making impairments and the effects of drugs on memory. Both systems are commonly impaired by drugs, and both involve retrieval systems.

This study will help increase the understanding of the effects of drugs. Individuals take psychoactive drugs because of their effects on feeling and thinking. However, the effects of drugs on thinking are relatively unexplored.

### Selected Publications

- Chapman, C.A. "The Effects of Cigarette Smoking Withdrawal on Information Processing." Honours Thesis, Psychology Department, University of Toronto, Toronto, Ontario, 1988.

**Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** R.B. Coombs, with L.T. Kozlowski and A. Chapman

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## The Cognitive Effects of Diazepam (Valium®)

The benzodiazepines, of which diazepam is a prototype, are the most prescribed class of drugs in Western industrialized countries. These drugs produce marked memory and psychomotor impairment. The effects have wide ramifications, including high levels of traffic mortality. This research builds upon an existing body of research concerned with cognitive impairments produced by psychoactive drugs. The study utilizes information-processing theory to investigate the underlying causes of these cognitive deficits, focusing on the effects of diazepam on decision making. In addition, the study aims to develop assessment methods to investigate the cognitive impairments produced by many other drugs, including alcohol.

### Research

Three experiments were carried out to identify mechanisms that underlie the cognitive deficits produced by diazepam. Using several well-known information-processing tasks, normal subjects received 15 mg of diazepam or placebo in a double-blind, repeated-measures design. Impairments were observed in the efficiency of access to memory, and in high-speed repeated decision making. These impairments may have wide implications for normal thinking. Any task that requires fast, accurate choices or access to memory may be liable to impairment by diazepam.

### Implications

This research helps identify the nature of the cognitive deficit that underlies driving impairment. It also helps establish a method of investigating

decision-making impairments produced by substances ranging from cocaine to antihistamines.

Further work will focus in more detail on the impairment in memory access observed in this work. One aspect of the data suggests that any drug that produces impairment in storing information should also produce impairments in retrieving that information. Such a finding would be a significant contribution to knowledge of how memory can be impaired by drugs.

**Selected Publications**

- Brunke, M.L., B.K. Alexander and R.B. Coambs. "Alcohol-induced Memory Impairments in Semantic Associations." [Abstract] *Canadian Psychology* 1986; 27(2a): #80.
- Coambs, R.B., H. Cappell and C.X. Poulos "Diazepam (Valium®) Impairs Decision Making." [Abstract] *Canadian Psychologist* 1987; 28(2a): #94.

**Sociobehavioural Research (Clinical Institute Division)**, in collaboration with the Social and Biological Studies Division

**Investigators:** R.B. Coambs, with H. Cappell and C.X. Poulos

***Goal 2: To develop better services for identification, treatment, and rehabilitation and to make them available to individuals and families in Ontario.***

Treatment and rehabilitation programs, methodologies and tools are developed by the ARF and made available to professionals involved in the assessment, treatment and rehabilitation of Ontarians suffering from problems as a result of alcohol and other drug use.

The first of the ARF's six major areas of treatment and rehabilitation research is the study of the availability of alcohol and drugs treatment services for individuals and families in Ontario, including:

- assessment of service needs
- evaluation of the efficacy and cost-effectiveness of treatment services

The ARF is also concerned with determining the treatment needs of specific groups, in particular:

- adolescents
- young adults
- seniors
- family members
- women

Development of behavioural and medical instruments and procedures for the diagnosis, assessment and classification of alcohol- and drug-related disorders, particularly in the early stages, is another major area of study within this goal.

The ARF is also focused on the development of effective sociobehavioural treatment (SBT) methods for changing the behaviours of people who use alcohol or drugs excessively. Particular attention is being given to methods that are economical, consistent with the Ministry of Health addiction treatment services policy and readily usable by non-ARF centres.

Treatment services for individuals and families

Treatment needs of special groups

Diagnosis and assessment methods

Sociobehavioural treatment (SBT) methods

Biomedical and biochemical treatment methods

Education, training and consulting services

The ARF is developing biomedical and biochemical treatment methods and services for people with problematic alcohol and drug use patterns, and for treating physical complications caused by excessive use. Priorities are:

- treatment of liver disease
- clinical trials of pharmacological treatments for excessive use
- treatment of brain damage
- treatment of alcohol and drug withdrawal

Finally, the ARF is developing education, training and consultation services for addictions agency personnel, other health care professionals and for those in business, industry and labour involved in Employee Assistance Programs (EAPs).

Priorities include:

- identification
- clinical management
- policies and standards
- needs assessment
- planning
- operations
- evaluation

## Treatment Programs

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### Province-wide Survey of Alcohol and Drug Programs

Since 1980 the Community Programs Evaluation Centre (CPEC) has conducted a major study of all addiction-specific services in Ontario every three years. The extensive information gathered in these surveys is critical to the planning, development and enhancement of addictions services by the Foundation and the Ministry of Health.

#### Research

Utilizing a survey format developed by CPEC, a province-wide survey of 200 alcohol and drug programs has been compiled. Using personal interviews, the field work for the survey was conducted by staff of the Community Services Division around the province. Changes in the provincial treatment network were analyzed in order to measure progress toward a full continuum of care (i.e., detoxification, assessment, alternative treatment settings, aftercare).

Since the surveys began, the major changes have been in the provision of detoxification services, assessment and referral programs, and short-term residential treatment. The provision of treatment in hospital-based settings has stabilized compared to a steady growth in the number and capacity of community-based services.

#### Implications

These surveys show the degree of correspondence between the objectives of provincial program and policy initiatives and ongoing program development. Thus, they highlight the achievements of a systems approach to treatment service development as

well as gaps in service delivery. By monitoring progress, as well as unmet needs, these surveys contribute to the more effective and efficient operation of the Ontario treatment network. The next survey is planned for 1989.



B.R. Rush

#### Selected Publications

- Rush, B.R. and A. Ekdahl. *Treatment Services for Alcohol and Drug Abuse in Ontario: Results of a Provincial Survey*. Toronto: Addiction Research Foundation, 1987.
- Community Programs Evaluation Centre Investigator: B.R.Rush

72

### Alcohol and Drug Treatment in Ontario

Since 1979 the Foundation has been collecting and analyzing data on various aspects of alcohol and drug treatment in Ontario. The results are made available to treatment and health care planners, professionals and local community groups. This information is important for planning purposes and to keep interested parties informed on the nature and changes of the Ontario treatment system.

#### Research

Data collection is based on large-scale data bases reflecting institutionalized treatment. These sources include general and specialized hospitals and, more recently, psychiatric hospitals, the detox system, special care and nonresidential facilities. During 1987-88, data on alcohol and drug treatment in Ontario have been collected for all hospitals reporting to the Hospital Medical Records Institute up to the year 1986.

The data have been analyzed in terms of specific alcohol and drug diagnoses on a county-by-county

basis, as well as to provide an overview of hospital use for the whole province in terms of specific administrative hospital practices, e.g., admission to hospital through the emergency department. Part of this material will be included in the forthcoming issue of *Statistics on Alcohol and Drug Use in Canada and Other Countries*, where it will be used in combination with other data to develop indicators of high levels of alcohol or drug problems within specific counties.

#### Implications

Results of this work are of interest to ARF staff and policymakers and are an important contribution to ARF and Ontario Ministry of Health addictions treatment planning efforts. One study generated by this program, *The Use of Hospital Beds for the Treatment of Excessive Drinkers Without Serious Medical Complications*, identified up to \$7 million in possible savings in alcohol treatment in Ontario. The program will continue to identify potential cost-cutting measures in the provision of addiction treatment in the province.

#### Selected publications

- Adrian, M. "Alcohol-related Casualty Statistics in Canada, Today and in the Realizable Future." [Abstract] In *Alcohol-related Casualties. Proceedings of an International Symposium, Toronto, Canada, August 12-16, 1985*, eds. Giesbrecht, N. and H. Fisher. Toronto: Addiction Research Foundation, 1987: 33-34.
- Adrian, M. "Alcohol-related Casualty Statistics in Canada." In *Selected Papers from the Symposium on Alcohol-related Casualties*, eds. Giesbrecht, N., R. Gonzalez, M. Grant, E. Österberg, I. Rootman and L. Towle. Toronto: Addiction Research Foundation, forthcoming.
- Ogborne, A. and M. Adrian. "The Use of Hospital Beds for the Treatment of Excessive Drinkers Without Serious Medical Complications." *British Journal of Addiction* 1987; 82: 193-196.

#### Prevention Studies (Social and Biological Studies Division)

In collaboration with the Community Programs Evaluation Centre and Sociobiological Research (Clinical Institute Division)

**Investigators:** M. Adrian, with P. Juil, R. Williams and A.C. Ogborne

**73**

### **Refinement of a Model for Estimating Quantitative Population-based Capacity Guidelines for Addiction Treatment Services**

In 1986 a preliminary model for estimating quantitative population-based capacity guidelines for addiction treatment services was developed at the request of the Ontario Ministry of Health. The model is intended to provide a frame of reference for making decisions about the ideal capacities of a wide range of addiction services, relative to the estimated nature and extent of alcohol problems in local populations. Few health jurisdictions in Canada or the United States have a general forecasting procedure for estimating the need for addiction treatment services on a quantitative basis. Although the preliminary model that was developed is highly specific to the Ontario treatment system, it does draw upon similar planning models that have been tried in a small number of other jurisdictions.

#### **Research**

In collaboration with the Community Mental Health Branch of the Ministry of Health, this model is being refined to ensure systematic development of addiction treatment services. The work has primarily involved exhaustive literature reviews of several aspects of the addiction field, and analyses of client information systems and other treatment-oriented data bases.

When the model is applied, the results show the required capacity of treatment services such as detoxification, assessment and outpatient, in terms of the number of individuals in the planning area that should be treated on an annual basis. Subsequently,

when the current supply of treatment services is documented along the same dimensions, the unmet need for each type of service is determined.

#### **Implications**

The model will assist the Ministry of Health in making decisions as to where, and to what extent, local services should be established or expanded. In addition, when the model is applied at the local level, it provides a much needed source of quantitative information to aid in identifying and prioritizing the needs for additional treatment resources. When combined with other types of quantitative and qualitative need-assessment data, a rational and sequential plan for treatment services development can also be prepared.

#### **Selected Publications**

- Rush, B.R. *A Model for Estimating Required Service Capacities for Addiction Treatment Programs in Ontario*. Ontario Ministry of Health, forthcoming.
- Rush, B.R. *A Model for Estimating Required Service Capacities for Addiction Treatment Programs in Ontario: An Executive Summary and Recommendations for Local Application*. Ontario Ministry of Health, forthcoming.
- Rush, B.R. *A Model for Estimating Required Service Capacities for Addiction Treatment Programs in Ontario: Phase II – Defining Current Capacity and Unmet Need*. Ontario Ministry of Health, forthcoming.

**Community Programs Evaluation Centre**  
**Investigator:** B.R.Rush

**74**

### **Hospital Utilization for the Treatment of Alcohol-related Problems**

Hospital-based treatment services are relatively more expensive than community-based treatment services and do not always provide the best or most appropriate treatment for many clients. The ARF has advocated the use of community-based treatment

services since the late 1970s. This program, which is an expansion of work done previously within the context of *Alcohol and Drug Treatment in Ontario* (see Research Entry # 72), is determining the impact of community-based treatment facilities on the utilization of hospital-based facilities. Specifically, the program asks: Is community treatment an add-on or a substitution for hospital treatment? This program formally came on stream during 1987-1988.

#### **Research**

Using overall system-wide data on numbers of programs and/or cases treated on a community- or hospital-based system in Ontario during the last 15 years, the study is determining the nature and extent of changes in the two systems of treatment, and their functional relationship. After existing data have been prepared and formatted for analysis, advanced regression and other analytic techniques will be used.

Most activities during 1987-1988 related to: 1) obtaining data for statistical analysis, 2) developing a methodologically and theoretically sound statistical analytic technique, and 3) doing the analysis. Data on *effects* (e.g., hospital utilization) were readily available in the files of the Statistical Research Program; data on *causes* (e.g., community-based treatment) were more difficult to obtain, partly due to the multiple ways of classifying and defining types of community-based treatment (at least nine different systems were identified).

#### **Implications**

Work in this program informs ARF staff and policy makers about the nature of changes and trends in Ontario's treatment network relative to the objectives of the ARF and Ministry of Health. As a result, the

work will contribute to the more efficient utilization of limited treatment resources. This analysis is expected to continue in subsequent years, using improved methodologies (e.g., pooled time-series analysis) with the addition of new data each year.

#### **Selected Publications**

- Adrian, M. (Chairperson), A. Ogborne and J.G. Rankin. *The Relationship Between Trends in the Use of Ontario's Hospital Beds, Per Capita Alcohol Consumption and Community-based Programs for the Treatment of Alcohol Abuse: The Report of the Committee on Hospital Utilization for the Treatment of Alcohol-related Problems*. Toronto: Addiction Research Foundation 1987.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Services Division, the Clinical Institute Division, the Administrative and Support Services Division and Computer Services

**Investigators:** M. Adrian, with A.C. Ogborne, J.G. Rankin, B.S. Ferguson, H. Lei, P. Jull and A. Manahan

## **Treatment Needs of Special Groups**

**75**

### **Studies of Treatment Services for Elderly Substance Abusers**

Research on substance use and problems has tended to ignore the elderly as a separate population. Existing evidence, however, suggests that some elderly people experience substantial problems with alcohol and/or other drugs, and that current addiction treatment approaches are probably not acceptable or suitable for many of these people. Moreover, the elderly may be especially at risk of experiencing dangerous (even life-threatening) consequences of substance use because of effects of the aging process on the body's ability to metabolize substances.

The Community Older Persons Alcohol Project (COPA) in West Toronto was developed to meet the special needs of substance-abusing seniors. The program provides assessment and referral, as well as outreach supportive counselling. Because the COPA project is unlike other addictions programs and because little is known about the target population, an extensive evaluation project is being conducted in collaboration with the COPA program and the ARF's Clinical Institute.

#### **Research**

This evaluation is aimed at increasing the understanding of the nature of alcohol and drug problems among the elderly and the manner in which these problems can best be addressed. The research involves:

- a comprehensive description of client status in all life areas at the time of admission to the program
- the development and validation of objective forms for measuring client status and worker interventions at

every client contact

- a description of client change during the course of the program using objective measures completed at every client contact
- a description of program implementation (i.e., the extent to which different interventions are employed during the course of the program)
- descriptions of which specific types of interventions are most useful in obtaining desired outcomes with clients, and which types of clients seem to benefit most from the program.

Data from 1985, 1986 and 1987 are currently being analyzed, and a final report on the COPA Project evaluation research is expected to be completed by the end of 1988.

#### **Implications**

This evaluation project has provided an opportunity to undertake a supplementary research project consisting of in-depth case studies of elderly persons who have alcohol problems. The case studies focus on three main areas: (1) the process of developing substance problems, (2) the nature of the problems, and (3) the implications for treatment programs.

The results of the COPA evaluation will indicate directions for research and clinical programs concerning the process and nature of substance abuse among the elderly, the physical, social, and emotional consequences of substance use in this age group, and the critical aspects of addictions treatment for older clients.

#### **Selected Publications**



K. Graham

- Graham, K. "Identifying and measuring alcohol abuse among the elderly: Serious problems with existing instrumentation" *Journal of Studies on Alcohol*, 1986; 47(4): 322-326.

- Graham, K. and C. Birchmore-Timney. "Interventions with Elderly Who Have Substance Problems." In *Proceedings of the 14th Annual Conference of the Ontario Psychogeriatric*

Association, Toronto, Ontario, May 24-26, 1987.

- Graham, K. and J. Romaniec. "Case Finding vs. Right to Privacy: A General Dilemma Emerging from a Study of the Elderly." *Journal of Drug Issues* 1986; 16: 391-395.
- Saunders, S.J., K. Graham, M. Flower and M. White-Campbell. "The Community Older Persons Alcohol Project: A Means of Enabling the Patient to Remain at Home." In *Research and Empirical Reflections about the Clinical Management of Dementia*, ed. Jones, J., forthcoming.

#### Grants

Part of the work in this program was supported by the National Health Research and Development Program.

**Community Programs Evaluation Centre**, in collaboration with the Hospital Outreach Program (Clinical Institute Division), and the Community Older Persons Alcohol Project (COPA)

**Investigators:** K. Graham, with S.J. Saunders, M. Flower, M. White-Campbell, C. Birchmore-Timney and A. Zeidman

## 76

### Attitudes of Treatment Personnel to the Elderly and to Homosexuals

Elderly and homosexual patients sometimes report difficulties in getting treatment for alcohol and drug problems. These studies are investigating the attitudes held by treatment personnel toward these two groups. They are also identifying issues for therapists to address in order to make interventions more relevant to the needs of these populations.

#### Research

**1. The Elderly:** Approximately 87 treatment and prevention personnel were asked about their attitudes toward and concepts of the elderly and the general population who are excessive drinkers. Respondents thought excessive drinking in the elderly was related to loneliness, loss of personal contacts and status, boredom and rejection.

**2. Homosexuals:** A large number of personnel at the Foundation and at

other alcohol treatment centres in Canada were surveyed, as were those in centres specializing in treatment for homosexuals. Respondents felt that homosexuals had different reasons for heavy drinking than heterosexuals, and that there were more heavy drinkers among homosexuals.

A collection of published and unpublished papers has been prepared for publication, entitled *Perspectives on Homosexuality, Alcohol and Drugs: Papers by Stephan Israelstam (Edited by Sylvia Lambert)*. The main topics in this collection are historical views of homosexuality; drinking and drug use behaviours; treatment; and views of therapists. These papers illuminate the special problems and needs of homosexual alcohol and drug users.

### 3. The Nature of Alcoholism as Seen by Alcohol Intervention Workers

**Workers:** In addition to the focus on the two special populations mentioned above, a study was conducted of the opinions of Canadian alcohol intervention workers about the nature of alcoholism. In this study, 494 intervention workers indicated their level of agreement with seven concepts describing alcoholism: a disease; a moral weakness; a genetic predisposition; a multi-faceted syndrome; a physiological weakness; an allergy; and learned behaviour. *Multi-faceted syndrome* was the most agreed-upon description, followed by *disease*. *Moral weakness* was the concept least indicated.

#### Implications

Information on the treatment needs of the elderly and of homosexuals can be used to improve treatment services for these populations. This information will also alert treatment personnel to the special needs of these people.

This project is largely completed and no new data collections, analyses or reports are planned. However,

some data could still be analyzed and will be made available to scientists especially interested in treatment issues.

#### Selected Publications

- Israelstam, S. "Homosexuals Who Indulge in Excessive Use of Alcohol and Drugs: Psychosocial Factors." *Journal of Alcohol and Drug Education*, in press.
- Israelstam, S. "Psychosocial Factors in Excessive Drinking of Senior Citizens and the General Population: Opinions of Alcohol Intervention Workers." *Psychological Reports* 1988; 62: 80-82.
- Israelstam, S. and K. Sykora. "The Nature of Alcoholism: Opinions of Canadian Alcohol Intervention Workers." *British Journal of Addiction*, in press.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** S. Israelstam, with S. Lambert and K. Sykora

## 77

### Natural Recovery Study

Published reports of outcomes of treated alcohol abusers are abundant. In contrast, there has been little study of the fate of untreated alcohol abusers, despite the fact that the ratio of untreated to treated alcohol abusers is considerable (estimated to range from 3:1 to 13:1). In addition, there is very little solid research investigating why the majority of alcohol abusers do not seek treatment. There is equally little known about the nature of recovery without treatment. The few studies of these phenomena have all had serious methodological flaws that preclude drawing firm conclusions from their results.

The objectives of this research program are to identify the factors, and particularly life events, that promote and maintain natural recovery from alcohol problems, (i.e., without formal treatment) and to examine the stability

of such recoveries over time. The program will also explore the relationship between such recoveries and cessation or reduction of tobacco and other drug use.

### Research

This study is based upon interviews with two groups: persons who have recovered from alcohol problems (for at least three years) and persons who have never received or sought formal help or treatment. This is the first study on this subject to include such a critical comparison group. Particular questions pertain to: the severity and nature of their problems; factors such as life events that would precipitate or facilitate their recovery; factors that have helped them maintain their recovery; and their reasons for not seeking formal help or treatment. Results of these interviews are contrasted with similar interviews with individuals who have active, similarly severe problems, but have never received or sought formal help or treatment. A collateral informant for each subject was also interviewed to verify the subject's report.

Preliminary analyses, based on an inventory of standard life events, have indicated that resolved abstinent subjects did not experience significantly more or different life events than the unresolved, nontreated subjects. Observation of the findings also suggests that there may be a relationship between resolution of the alcohol problem and stopping or reducing tobacco use. The possibility of such a relationship will be explored in more detail in five-year follow-up interviews, when information on tobacco use or cessation of use will also be gathered.

A pilot study of the reliability of 69 alcohol abusers' self-reports of distant life events and drinking has also been completed and the results reported,

as has a related study conducted by a University of Toronto student under supervision of the principal investigator.

### Implications

Findings from this program are expected to suggest why health care services are underutilized by persons with alcohol problems, and how the utilization of services can be enhanced. The results of this study could have an impact on health care delivery practices. They may also provide direction for developing and testing new treatments and self-change strategies for alcohol abusers who are unwilling and unlikely to use existing health care agencies.

The findings from the second phase of the study, which will begin shortly, can be expected to shed light on the stability of long-term recoveries and on the relationship between the use and nonuse of alcohol and other psychoactive substances, including tobacco and caffeine.



M.B. Sobell

### Selected Publications

- Sobell, L.C., M.B. Sobell, D.M. Riley, R. Schuller, D.S. Pavan, A. Cancilla, F. Klajner and G.I. Leo. "The Reliability of Alcohol Abusers' Self-reports of Drinking and Life Events that Occurred in the Distant Past." *Journal of Studies on Alcohol* 1988; 49: 225-232.

### Grants

A grant application to support the second phase of the investigation has been approved by the National Institute on Drug Abuse in the U.S., and funding is pending.

### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.C. Sobell and M.B. Sobell

## Diagnosis and Assessment Methods

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### Cognitive Rehabilitation Clinic

The performance of alcohol abusers on neuropsychological tests typically demonstrates a reduction in their ability to plan, categorize and abstract information. Although alcohol abusers may appear normal on the verbal level, the cognitive abilities necessary for learning are usually reduced. The degree and spontaneity of the recovery of these abilities following abstinence varies with the circumstances of each individual.

The Cognitive Rehabilitation Clinic will use neuropsychological tests to determine the presence of cognitive deficits, provide rehabilitation exercises via desktop computer and determine the effect of feedback on the rate of improvement. The usefulness of rehabilitative computer software programs to enhance the cognitive performance of individuals who have experienced traumatic brain injury is well established. The use of these techniques to facilitate the recovery of alcohol abusers is not established, nor is the possible motivational effect of feedback about the improvement of cognitive abilities and related parameters.

### Research

The cognitive rehabilitation procedures will be utilized during the early stages of abstinence. Project planning and the identification of appropriate computer software was completed in the first half of 1988. The clinic began operations in the fall of 1988 following the familiarization of the Assessment Unit staff and Predoctoral Fellow with

the treatment and data collection procedures. A computer graphics program will be used to provide feedback to selected patients following each rehabilitation session.

### Implications

From a scientific point of view, the Cognitive Rehabilitation Clinic will provide a setting for research on the reversibility of cognitive deficits associated with alcohol and other drug use. From an educational perspective, the clinic will be used to train clinical students in the use and interpretation of neuropsychological tests and related procedures.

The clinic will help the ARF to facilitate the development, evaluation and demonstration of a method to identify and rehabilitate individuals damaged by hazardous use. Showing evidence of continuing improvement may motivate clients who might otherwise drop out of treatment or return to drinking. In addition, the clinic will demonstrate a readily transportable treatment service; maintain and enhance the clinical skills of staff and students; and provide a setting for the pursuit of clinical research in the treatment of brain damage.



E.J. Larkin

**Sociobehavioural Research (Clinical Institute Division)**  
**Investigator:** E.J. Larkin

### 79

#### Diagnosis of Alcohol Abuse

The diagnosis of acute and chronic alcohol abuse is of major importance in a number of settings. In the emergency room of a hospital or in the detoxification unit it is important to determine quickly the nature of the intoxication, in order to distinguish it from other dangerous conditions. Early diagnosis of chronic alcohol abuse is also important to the physician and the psychologist, as the effectiveness of alcoholism treatments is greatly affected by the severity of the disease.

### Research

The objective of this research program is to develop and refine instruments and procedures for the diagnosis of alcohol abuse. Three lines of research form this program:

1. Investigators have developed a method to noninvasively detect alcohol evaporating from the eye. A gas sensor at the apex of a small eye-cup transforms alcohol into an electrical signal that provides a measurement of blood alcohol levels in 15 seconds. The measure is 95 per cent accurate (thus exceeding all other noninvasive methods). It is not affected by residual alcohol in the mouth as is the breath analysis instrument, and can be used in unconscious individuals in whom the eyelids can be opened.

Patents have been requested for the animal and clinical *eyealyzer*, and the manufacturing rights have been transferred to a major manufacturer of breath analysis instruments.

2. Studies have been conducted on the detection of stable biochemical products that are formed after alcohol ingestion, with a view to developing specific and sensitive laboratory

indicators of the amount of alcohol consumed chronically by individuals. A method has been developed to immunologically assess chronic alcohol consumption by the levels of acetaldehyde-hemoglobin adducts. Patents have been applied for in several countries.

Future directions for this research will aim to improve the methodologies and detection capabilities by analyzing different protein-acetaldehyde adducts in the blood of alcoholics. The relationship between withdrawal and adduct levels will be studied.

3. The alcohol dipstick, a small litmus-like strip of paper that determines the concentration of alcohol in saliva or urine, was developed by researchers at the Foundation several years ago. Patents have recently been granted in a number of countries. Investigations have now shown that the alcohol dipstick can be used in clinical settings by nontrained personnel, with accuracies that exceed 90 per cent in relation to specialized laboratory methods. Under the sponsorship of the World Health Organization, this device is being tested in emergency units in a number of countries. Some hospitals in Ontario and California have started using it on a routine clinical basis.

### Implications

The development and utilization of these markers of alcohol abuse will improve the early identification of chronic alcohol abuse and alcohol intoxication, and also aid in assessing the success of different treatment approaches. In addition, they will be of value to physicians, psychologists, emergency room personnel and other professionals who come into contact with alcohol-abusing clients.

**Selected Publications**

- Giles, H.G., S. Meggiorini, G. Renaud, J.J. Thiessen, E.I. Vidins, K.V. Compton, V. Saldivia, H. Orrego and Y. Israel. "Ethanol Vapor Above Skin: Determination by a Gas Sensor Instrument and Relationship with Plasma Concentration." *Alcoholism: Clinical and Experimental Research* 1987; 11: 249-253.
- Giles, H.G., S. Meggiorini, E.I. Vidins and Y. Israel. "Measuring Alcohol Vapours Above the Eye." *The Lancet* 1987; 8558: 580-581.
- Giles, H.G., S. Sandrin, B.M. Kapur and J.J. Thiessen. "Ethanol Vapours Above Lacrimal Fluid in the Rabbit." *Canadian Journal of Physiology and Pharmacology* 1987; 65: 2491-2493.
- Giles, H.G., S. Sandrin, V. Saldivia and Y. Israel. "Noninvasive Estimation of Blood Alcohol Concentrations: Ethanol Vapor Above the Eye." *Alcoholism: Clinical Experimental Research* 1988; 12: 255-258.

**Grants**

This work is supported by the U.S. National Institute on Alcohol Abuse and Alcoholism, and the Alcoholic Beverage Medical Research Foundation.

**Biochemical Research (Social and Biological Studies Division)**, in collaboration with the Clinical Institute Division

**Investigators:** G. Giles, Y. Israel and B.M. Kapur, with G. Rachamin, E. Vidins, S. Sandrin and A. Macdonald

**80****Determining Roles of Assessment/Referral Services**

Ontario currently has 31 specialized addictions assessment/referral services, most of which were established during the past six years.

Assessment/referral services are considered necessary because there are many types of addiction problems, involving people with different characteristics in different circumstances. These services are expected to determine the nature and extent of problems presented by their clients, with a view to selecting the most appropriate course of action – a process that will enhance both the effectiveness and efficiency of treatment systems.

A 1983 survey of Ontario's assessment/referral services showed that services established at that time varied considerably with respect to their characteristics and functioning. Some services seemed to be very similar to traditional outpatient clinics, while others referred most of their clients to other agencies for outpatient and other kinds of treatment. Other studies of selected assessment/referral services have shown these services to be well respected by local health and social service professionals.

**Research**

This research is based primarily on analyses of data from three province-wide surveys of Ontario's addiction treatment agencies, conducted by the Foundation in 1980, 1983 and 1986 respectively (see Research Entry #71). The present analysis will focus on trends in referral to and from assessment/referral services, and trends in the characteristics of clients seen by these services. Comparisons involving referral patterns and client characteristics for assessment/referral services and outpatient services will also be made. The final report, which should be available by the end of 1988, will also summarize the results of other studies of Ontario's assessment/referral services.

**Implications**

The results of this program will have implications for the planning of new assessment/referral services and for the evolution of existing services. With an increasing number of outpatient services, the results should indicate how assessment/referral and outpatient services can best work together.

**Selected Publications**

- Ogborne, A.C. and D. Dwyer. "A Survey of Assessment/Referral Services for Alcohol and Drug Abusers in Ontario." *Canadian Journal of Community Mental Health* 1986; 5(1): 89-97.
- **Community Programs Evaluation Centre Investigators:** A.C. Ogborne with B.R. Rush

**81****Development and Testing of Modified/Alternative Assessment Methods**

In 1984 the Addiction Research Foundation developed and promoted a structured interview schedule for use in specialized assessment/referral services. This schedule, known as ASIST (A Structured Interview for Selecting Treatment), replaced a number of previous instruments that were regarded as inadequate in content and validity. ASIST is a comprehensive instrument designed to assess the nature and extent of alcohol and drug use among those attending assessment/referral services. Such assessments are designed to ensure that clients are referred to the most appropriate agencies for help and treatment.

ASIST has been formally endorsed by the Ontario Ministry of Health and is now being used by most assessment/referral services. Although the instrument has been reported as being useful, some concerns have been expressed as to its length and the validity of some sections. This study is designed to develop and test revised versions of this instrument.

**Research**

This study has four main parts:  
 1) Questionnaires were mailed to all staff of Ontario's assessment/referral services to measure user satisfaction with ASIST. The results showed that ASIST was used routinely in most services and that most sections were

seen as useful. However, there were concerns as to the length of the instrument, and there were many suggestions for improving particular questions and sections. Some additional items were also suggested by some users. Based on this feedback and other considerations, a revised, shortened version of ASIST has been developed; this is currently being field tested in three assessment/referral services.

2) The reliability of measures of alcohol consumption generated from ASIST is being assessed by means of an experimental study in which ASIST's alcohol consumption measures are compared with equivalent measures derived from another well-researched interview. Preliminary results suggest that the two methods give similar results for clients with stable drinking patterns.

3) A study that aims to demonstrate the use of a microcomputer to support a management information system for assessment/referral services is under way at the ARF assessment/referral services in Kitchener. This study monitors the impact of introducing the computer and explores its optimum use as a management tool. The use of computers in the administration of ASIST and other aspects of the assessment/referral process has been considered for some time.

4) Plans to use a computer for client assessments are currently being developed at the Kitchener assessment/referral service. Staff are being introduced to the concept of computerized assessment, and considerations are being given to the development of appropriate software. A study which seeks to demonstrate the benefits of computerized assessments will be developed when this software is available.

### Implications

Following the field test, it is expected that the revised ASIST will be endorsed by the Ministry of Health and used by most assessment/referral services. It is also expected that experiences gained in using a computer for management purposes and for client assessments will influence the ways in which computers are used in other assessment/referral services.



A.C. Ogborne

**Community Programs Evaluation Centre and Sociobehavioural Research (Clinical Institute Division)**  
**Investigators:** A.C. Ogborne, with M.B. Sobell, L. C. Sobell, B. Becks and M. Gavin

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## Defining the Coordination and Advocacy Components of Case Management in Addictions Treatment

There is still a lack of precision in the manner in which case management is defined among various health care professionals. In particular, existing literature is vague in defining coordination and advocacy, two central functions of supportive care. In order to develop case management services that fulfill the specialized role of continuity of care, two kinds of data are needed: (1) data on the circumstances under which case coordination and advocacy are appropriate, and; (2) data on effective methods of providing coordination and advocacy.

### Research

The Community Programs Evaluation Centre is undertaking a study of four assessment/referral/case management programs in Ontario. The objectives of the research are: (1) to

describe the nature and extent of coordination and advocacy relative to other case management functions; (2) to test hypotheses concerning the client or agency parameters that determine the nature, extent, and success of coordination and advocacy across sites; and (3) (where differences among sites appear) to explore the differences in community treatment systems that account for site differences in the implementation of coordination and advocacy.

Pilot work and instrument development were conducted in 1987, and data collection began at the Assessment/Referral Centre in Perth, Ontario, in 1988. Data collection will begin January 1, 1989, at three other assessment/referral centres in Ontario.

### Implications

This research will enhance understanding of the critical dimensions of coordination and advocacy as implemented within addictions treatment. The replications in three different programs will identify the extent to which case management is consistently implemented (regardless of variables related to personnel and context), and will provide a foundation for developing hypotheses regarding more or less effective/efficient strategies for providing case management.

### Selected Publications

- Graham, K. "Evaluating Case Management: Asking the Right Questions." In *Proceedings of a Workshop on Evaluation of Front-line Mental Health Services, October 9, 1985*. Toronto: Ontario Mental Health Foundation, 1986: 1-3.
- Graham, K. and C. Birchmore-Timney. "The Problem of Replicability in Program Evaluation: The Component Solution Using the Example of Case Management." *Evaluation and Program Planning*, in press.

**Community Programs Evaluation Centre**, in collaboration with the Lanark-Leeds-Grenville Assessment/Referral Service

**Investigators:** K. Graham, with C. Bois and C. Birchmore-Timney

**83**

### **Extent of Duplication of Services by Case Managers of Persons Receiving Addictions Treatment**

The Addictions Services Policy of the Ontario Ministry of Health (1985) defines case management in the addictions field as "the process of monitoring, tracking and providing support to a client throughout the course of his/her treatment and after." One of the dilemmas that has arisen in the delivery of case management is the possible multiplicity of case managers and the services that they provide. People experiencing substance problems seem to be in contact frequently with a range of helping agencies. In addition, it is not infrequent for addicted persons to receive help from more than one addictions-specific agency simultaneously or consecutively. Consequently, people who have substance problems may find themselves involved with more than one agent who sees his or her role as "case management".

#### **Research**

The present research is directed toward identifying the extent of duplication of case management services for clients who are receiving aftercare from a residential hospital-based addictions program (St. Thomas Addiction Rehabilitation Unit). Where overlap in services appears to exist (i.e., several agencies in addition to the Addiction Rehabilitation Unit are providing case management to a client), data gathered from clients and case managers will be used to evaluate the extent to which multiple case managers provide complementary services, and the extent to which services provided by more than one

case manager are redundant or conflicting.

During 1987 and early 1988, the plan for the research was designed, data collection instruments were developed and pilot-tested, and consent obtained from all relevant community agencies to participate in the project. Data collection began June 1, 1988, with three objectives:

- (1) monitoring delivery of case management services at each case manager-client contact;
- (2) monitoring delivery of case management services concerning the target client, but where contacts were between the case manager and someone other than the client; and,
- (3) assessing, through interviews with clients, the clients' perceptions of case management services that they received.

At present, the study is being restricted to 100 clients of the Addiction Rehabilitation Unit who live in Middlesex County. Future studies may address overlap in case management services in other treatment systems.

#### **Implications**

Results of the St. Thomas study should help to direct aftercare resources to areas of client support that tend not to be handled by other agencies; equally, the study will aid in identifying where there may be duplication of services and where increased interagency coordination can reduce unnecessary overlap, while ensuring that clients receive sufficient and appropriate care.

Information derived from this research will assist in understanding the spectrum of services provided to addicted persons and the systems in which these services operate; it will also help to define the appropriate role for case management services that

are associated with addictions-specific programs.

#### **Community Programs Evaluation**

**Centre**, in collaboration with the Addiction Rehabilitation Unit of St. Thomas Psychiatric Hospital

**Investigators**: K. Graham, with C Birchmore-Timney and P. Ferguson

**84**

### **Rehabilitation Approaches for Convicted Drinking Drivers**

An important response to the drinking and driving problem has been the provision of various forms of rehabilitation for convicted drinking drivers. Many jurisdictions in North America, Australia and Europe have implemented education-based and/or treatment-based programs for these individuals. There is some controversy, however, over which programs are effective for which types of individuals, or indeed, whether they are effective at all. Thus, information on the effectiveness of rehabilitation efforts is needed in order to develop effective assessment and program components.

#### **Research**

This research program features two components:

1. Monitoring and review of the relevant literature on assessment and rehabilitation of convicted drinking drivers has been done. This review of outcome literature has revealed substantial empirical support for the proposition that educative programs may have some beneficial effects for offenders with low problem levels, while offenders with high problem levels are more suited to long-term, individually oriented treatment efforts.

The literature on the various demographic, psychosocial, biological, and

alcohol-related factors that predict drinking-driving recidivism and accidents is now being reviewed to provide additional guidance for assessment and rehabilitation efforts.

2. A long-term study of the effects of educative rehabilitation on second offenders has been done. In this study, convicted second offenders who attended similar rehabilitation programs in Oshawa and North Bay (and individuals who were assigned to a control group) have been interviewed, and relevant death records and driving records are being obtained. The interview data indicate that different patterns of alcohol consumption, alcohol problems and personality factors are associated with risk of subsequent drinking-driving convictions and alcohol-involved accidents.

### Implications

Preliminary guidelines are available for implementing assessment and program options that are likely to be most successful in reducing recidivism by program participants. These reports are being used in Ontario and elsewhere to implement, revise and evaluate assessment and rehabilitation programs. The usefulness of various assessment measures is still being analyzed.

### Selected Publications

- Addiction Research Foundation. *Curative Treatment in Ontario: A Working Definition, and Preliminary Resource Lists*. Toronto: Addiction Research Foundation, 1987.
- Mann, R.E. [Book Review] 'Rehabilitation of Drunk Drivers in Australia and New Zealand.' Sanson-Fisher, R. et al. eds. *Accident Analysis and Prevention* 1987; 19: 499-501.
- Mann, R.E., E. Vingilis, L. Anglin, H. Suurvali, L.M. Poudrier and K. Vaga. "Long-term Follow-up of Convicted Drinking Drivers." In *Alcohol, Drugs and Traffic Safety - 786*, eds. Noordzij, P.C. and R. Roszbach. Amsterdam: Elsevier, 1987: 545-548.
- Mann, R.E., E. Vingilis and K. Stewart. "Programmes to Change Individual Behaviour: Education and Rehabilitation in the Prevention of Drinking and Driving." In *The Social Control of*

*Drinking and Driving*, eds. Laurence, M.D., J.R. Snortum and F.E. Zimring. Chicago: University of Chicago Press, 1988, 248-269.

### Prevention Studies (Social and Biological Studies Division)

**Investigators:** E. Vingilis and R.E. Mann, with L. Anglin, H. Suurvali, L.M. Poudrier, K. Vaga and K. Stewart

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### Identification and Early Intervention

There is increasing evidence that lifestyle problems, such as excessive drinking, cigarette smoking and drug abuse, can be successfully treated with brief interventions. The primary care physician is in a good position to identify patients who misuse drugs, and to intervene with brief counselling at an early stage, when prognosis is most favourable. However, lifestyle problems often remain undetected in hospitals and in family practices. Cost-effective strategies are needed for case finding and brief intervention.

A major project using a Computerized Lifestyle Assessment is being conducted in collaboration with the Family Practice Service at Toronto General Hospital and the Broadview Community Health Centre. The aim is to develop practical instruments for early identification of alcohol- and drug-related disorders.

### Research

The Computerized Lifestyle Assessment was administered to approximately 1300 patients visiting their family doctors; 160 problem drinkers were identified. These problem drinkers will be followed up six months later to evaluate the impact of assessment feedback on reducing alcohol consumption and related lifestyle problems. A report has been

completed which examines patients' attitudes about lifestyles, and expectations about the level of involvement from family physicians. Other papers in preparation focus on the relationship between lifestyle practices and patients' use of the health care system; the lifestyle profile of early-stage problem drinkers; and relationships among various lifestyle habits and patients' reasons for consulting their family doctors.

The Computerized Lifestyle Assessment is being adapted for use with special populations and in special settings. An adolescent version of the lifestyle assessment will be tested with patients attending the Youth Clinic at the Foundation. Preliminary discussions are also under way regarding a project that will evaluate the Computerized Lifestyle Assessment in the workplace, both as part of health promotion initiatives and as part of employee assistance programs. Finally, the Sexual Activities section is being expanded and will be evaluated as a health education and clinical prevention tool for sexually transmitted diseases, particularly Acquired Immune Deficiency Syndrome (AIDS). A study will be conducted at the Clinical Institute with injection drug users, a high-risk group for AIDS.

Another project in collaboration with Dr. Stephen Holt (University of Southern Illinois Medical School) has identified a short list of clinical and laboratory criteria for the identification of alcohol abuse, called the Alcohol Clinical Index. This instrument and an instruction manual have been published by the Foundation for use by physicians and nurses in a variety of clinical settings for the identification and management of alcohol problems. A basic strategy has been recommended that includes administration

of the Alcohol Clinical Index, in conjunction with brief questionnaires on alcohol consumption and related problems, as well as laboratory tests associated with excessive drinking.

### Implications

The Computerized Lifestyle Assessment is being used in a number of collaborative projects in North America and Australia. The computer software is being evaluated in specialized medical clinics (e.g., gastroenterology), in the criminal justice system and in a community hospital. It will soon be evaluated in the workplace. The Computerized Lifestyle Assessment software and a user's manual are published and distributed by the Foundation.

The Computerized Lifestyle Assessment and Alcohol Clinical Index are practical instruments for use in a variety of settings, including the health, education, social service and justice systems. Routine use of these instruments should make significant inroads to the identification of alcohol and drug problems that often remain undetected and untreated.

### Selected Publications

- Allen, B.A. and H.A. Skinner. "Lifestyle Assessment Using Microcomputers." In *The Practitioner's Guide to Computer-based Psychological Testing*, ed. Butcher, J.N. New York: Basic Books, 1987.
- Skinner, H.A. "Early Detection of Alcohol and Drug Problems - Why?" *Australian Drug and Alcohol Review* 1987; 6: 293-301.
- Skinner, H.A., B.A. Allen, W.J. Sheu and R. Kay. *Computerized Lifestyle Assessment: Background Research and User Manual*. Toronto: Addiction Research Foundation, 1988.
- Skinner, H.A. and S. Holt. *The Alcohol Clinical Index: Strategies for Identifying Patients with Alcohol Problems*. Toronto: Addiction Research Foundation, 1987.
- Skinner, H.A. and S. Holt. *Four Questionnaires Comprising the Alcohol Clinical Index*. Toronto: Addiction Research Foundation, 1987.
- Skinner, H.A., W. Palmer, M. Sanchez-Craig and M. McIntosh. "Reliability of a Lifestyle Assessment Using Microcomputers." *Canadian Journal of Public Health* 1987; 78: 329-334.

### Grants

Work on the Computer Lifestyle Assessment has been funded, in part, through a National Health Research Development Program (NHRDP) grant, Health and Welfare Canada.

### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** H.A. Skinner, with R. Kay, M. Sanchez-Craig, M. McIntosh (ARF and TGH), W. Palmer (TGH) and S. Holt (University of Southern Illinois)

### 86

### Inventory of Drinking Situations and Situational Confidence Questionnaire

The process of relapse is increasingly being recognized as an important issue in the study of addictive behaviours. Work done by Alan Marlatt and his colleagues (in the Psychology Department, University of Washington) has shown that there are similarities among alcoholics and other drug abusers in the situational antecedents to relapse episodes.

*The Inventory of Drinking Situations (IDS)* (H.M. Annis, Toronto: Addiction Research Foundation, 1982) was developed as a situation-specific measure of drinking that can be used to identify a client's high-risk situations for alcoholic relapse.

In addition, successful experience in controlling alcohol use has been found to increase a client's self-efficacy or confidence to cope with drinking situations, and thereby decrease the client's probability of relapse. *The Situational Confidence Questionnaire* (H.M. Annis, Toronto: Addiction Research Foundation, 1987) was developed as a tool for therapists to monitor the development of a client's self-efficacy in relation to specific drinking situations over the course of treatment. It is also intended to serve as a measure of alcohol-related self-

efficacy for scientists interested in studying treatment outcome and the process of alcoholic relapse.

The objectives of this research program are to evaluate these two self-report questionnaires further (together with computer interactive software packages), and to publish periodically updated editions of the user's guides.

### Research

**1. The Inventory of Drinking Situations:** This 100-item self-report questionnaire provides a situational diagnostic profile of drinking risk for an alcoholic client seeking treatment.

Factor analysis has supported the use of an eight-category profile of drinking situations. Further psychometric work has resulted in the development of a short form of the questionnaire with good internal reliability on all eight subscores.

It has been found that clients' hierarchies of risk situations on the IDS agree well with the frequency of relapses occurring in drinking risk categories reported by Marlatt; over two-thirds of the clients had their highest risk situation for drinking on the IDS in response to negative emotional states, interpersonal conflict or social pressure to drink.

**2. The Situational Confidence Questionnaire:** This 100-item self-report questionnaire provides a measure of client self-efficacy in relation to eight categories of high-risk drinking situations. Psychometric work has resulted in the development of two short forms of the questionnaire, each with good internal reliability.

Responses on the questionnaire have been found to be predictive of the likelihood of relapse and of the type of situation in which serious relapse to drinking is likely to occur.

**Implications**

The Inventory of Drinking Situations serves as an important treatment planning tool, providing a profile of a client's areas of greatest drinking risk. In addition, because the Situational Confidence Questionnaire has been found to predict treatment outcome, repeated administration can serve as an aid to therapists in monitoring a client's progress in treatment. Future directions for this program will see the collection of new data on both questionnaires from studies within the Foundation and from ongoing research of scientists elsewhere, so that updates to the user's guide can be undertaken.



H.M. Annis

**Selected Publications**

- Annis, H.M. and C.S. Davis. "Assessment of Expectancies." In *Assessment of Addictive Behaviors*, eds. Donovan, D.M. and G.A. Marlatt, New York: Guilford Press, 1988: 84-111.
- Annis, H.M. and C.S. Davis. "Self-efficacy and the Prevention of Alcoholic Relapse: Initial Findings from a Treatment Trial." In *Assessment and Treatment of Addictive Disorders*, eds. Baker, T.B. and D. Cannon. New York: Praeger Publishing Co., 1988
- Annis, H.M. and J.M. Graham. *Situational Confidence Questionnaire User's Guide*. Toronto: Addiction Research Foundation, 1988
- Annis, H.M., J.M. Graham and C.S. Davis. *Inventory of Drinking Situations (IDS) User's Guide*. Toronto: Addiction Research Foundation, 1987
- Solomon, K.E. and H.M. Annis. "Development of a Scale to Measure Outcome Expectancies in Alcoholics." *Cognitive Therapy and Research*, in press.

**Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** H.M. Annis, with M. Graham and C.S. Davis

**87****Inventory of Drug-taking Situations and Drug-taking Confidence Questionnaire**

Alan Marlatt and his colleagues (in the Psychology Department, University of Washington) have documented similar situational antecedents to relapse episodes among clients abusing a variety of addictive substances. Two self-report questionnaires, *The Inventory of Drug-taking Situations* and the *Drug-taking Confidence Questionnaire* (H.M. Annis and G. Martin, Toronto: Addiction Research Foundation, 1985) were developed to provide a situational analysis of a client's high-risk situations for drug use, and a client's confidence level in coping with these situations. These instruments parallel the instrumentation available for the assessment of alcoholics (see Research Entry # 86). Content for development of the questionnaires was derived from functional analyses of the use of drugs by young drug abusers at the Clinical Institute over several years.

The objectives of this research program are to further evaluate these two self-report questionnaires (including computer interactive software versions) and to publish user's guides.

**Research**

1. **Inventory of Drug-taking Situations (IDS):** This 50-item self-report questionnaire follows a classification system based on the work of Marlatt and his associates. The scale is divided into two major classes: (1) intrapersonal determinants, in which the drug use involves a response to an event that is primarily psychological or physical in nature, and (2) interpersonal determinants, in which a significant influence of another individual is involved.

Within these two classes, eight categories of drug-use situations are assessed, and the eight subscores constitute a drug-taking risk profile for each client.

**2. Drug-taking Confidence**

**Questionnaire (DTCQ):** This 50-item self-report questionnaire is designed to assess Bandura's concept of self-efficacy in relation to a client's perceived ability to cope effectively with drugs. The situations assessed by the questionnaire are based on the empirical work of Marlatt and his associates in their study of the areas of highest risk for relapse among drug users. As with the Inventory, this scale is divided into two major classes, featuring eight subscores.

The literature on self-efficacy suggests that the total score across all areas should predict the probability that a client will relapse, and that the client's profile of subscores should predict the most likely types of situations associated with relapse.

**Implications**

The clinical utility of the two questionnaires will be field tested in 1988-1989 on youth having problems associated with drug use who have been admitted to the Clinical Institute and to the Hospital for Sick Children. The focus will be on the clinical feedback, refinement of the software package, introduction of the software into the Hospital for Sick Children, and the development of a data base that can be used for further refinement of the questionnaires. In addition, the psychometric properties of the questionnaires will be examined, and the drug-taking risk situations of youth with different drugs of abuse will be explored.

**Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** H.M. Annis with G.W. Martin

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## Diagnosis and Assessment of Alcohol and Drug Abuse

Research indicates that different types of drug-dependent persons benefit from different types of treatment. Hence clients should be matched to appropriate treatments. In order for this matching hypothesis to be tested, distinct syndromes among clients must be identified. The objective of this research program is to develop instruments for the classification, diagnosis and assessment of alcohol- and drug-related disorders.

### Research

Three related lines of research are currently working toward this goal:

1. Several instruments have been developed for the assessment of alcohol/drug problems, including the Alcohol Dependence Scale, the Drug Abuse Screening Test and the Lifetime Drinking History. These instruments are being used in a number of treatment and evaluation projects throughout North America and internationally. For example, the Alcohol Dependence Scale provides a measure of the alcohol dependence syndrome, which is a core concept in both the World Health Organization classification system (ICD) and that of the American Psychiatric Association (DSM-III). Two studies have been completed in which the diagnostic accuracy (sensitivity, specificity, predictive value) of the Alcohol Dependence Scale (ADS), the Michigan Alcoholism Screening Test (MAST) and the Drug Abuse Screening Test (DAST) were evaluated against DSM-III diagnoses.

2. A multiaxial classification system has been proposed for the diagnosis of alcohol and drug problems. Relationships among a comprehensive

set of psychosocial and biomedical measures have been analyzed using sophisticated procedures for confirmatory factor analysis (LISREL). The results support the concept of a core alcohol dependence syndrome, as well as the importance of three related factors: drinking frequency, drinking quantity, and adverse consequences from drinking. This framework has direct implications for matching clients with treatments.

3. Innovative uses of computers for conducting assessments are being examined. A microcomputer is being used to record response latencies, that is, the delay of an individual in responding to a potentially sensitive item. This unobtrusive measure has been found in other research to predict which individuals are providing less consistent or inaccurate information. The basic strategy of this research is to identify individuals who may be giving inaccurate information, and to intervene in order to enhance the accuracy of self-reports.

### Implications

Improved matching of clients to appropriate treatments will increase treatment success rates and lead to a more efficient utilization of treatment resources.

Work in this program will lead to major updates to test manuals for ADS and DAST; the Drug Abuse Screening Test will be published formally by 1989.

### Selected Publications

- Gavin, D., H.E. Ross and H.A. Skinner. "Diagnostic Validity of the Drug Abuse Screening Test in the Assessment of DSM-III Drug Disorders." *British Journal of Addiction*, in press.
- George, M. and H.A. Skinner. "Innovative Use of Microcomputers for Measuring the Accuracy of Assessment." In *Microcomputers, Psychology and Medicine*, eds. West, R., M. Christie and J. Weinman. New York: Wiley, forthcoming.
- Leigh, G. and H.A. Skinner. "Physiological Assessment." In *Assessment of Addictive Behaviours*, eds. Donovan, D.M. and G.A. Marlatt. New York: Guilford Press, 1988: 112-136.

•Morey, L.C. and H.A. Skinner. "Empirically Derived Classifications of Alcohol-related Problems." In *Recent Developments in Alcoholism*, ed. Galanter, M. New York: Plenum Press, 1986; (4): 145-168.

- Skinner, H.A. "Validation of the Dependence Syndrome: Have We Crossed the Half-life of This Concept?" In *The Nature of Dependence*, ed. Lader, M. Oxford University Press, forthcoming.
- Skinner, H.A. "A Model for the Assessment of Alcohol Use and Related Problems." *Drugs and Society*, 1987; 2: 19-30.

### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** H.A. Skinner, with H. Ross, M. George and D. Gavin

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## Family Assessment Methods

A variety of theoretical and empirical work has shown that family relationships can be significantly related to excessive alcohol and drug use. Due to the range of constructs, data sources, assessment targets and techniques, however, the assessment of family functioning presents major challenges. The main goal of this program is to develop a theoretical model and associated assessment techniques for assessing family members of substance abusers. Efforts have focused on the formulation of the Process Model of family functioning, as well as on the development of a self-report questionnaire (Family Assessment Measure), structured clinical interview (FAM Interview), and rating scales for assessing constructs of the model (FAM Rating Scale).

### Research

The Family Assessment Measure (FAM) is a self-report instrument that provides quantitative indices of a family's strengths and weaknesses in seven areas: task accomplishment, role performance, communication,

affective expression, involvement, control, and values and norms. FAM consists of three components:

- a General Scale that focuses on the family as a system
- a Dyadic Relationships Scale that examines relationships between specific pairs in the family
- a Self-Rating Scale that taps the individual's perception of his/her functioning in the family.

Each scale provides a different perspective on family functioning. Empirical analyses have shown that the FAM scales are quite reliable, and that they differentiate significantly between problem and nonproblem families.

A major validation project is under way in collaboration with Dr. Theodore Jacob, University of Arizona. This project involves three types of families: (1) one in which the father is alcoholic, (2) one in which the father is clinically depressed, and (3) one in which the father is normal, with no history of mental problems. Preliminary analyses have shown that FAM significantly differentiates among the three types of families. The alcoholic families tend to report a broad range of problems related to task accomplishment, communication, family involvement and role performance.

### Implications

A five-year research grant proposal has recently been prepared in collaboration with Dr. Jacob and Dr. Paul Steinhauer (Hospital for Sick Children, Toronto). This project proposes to examine convergence across different methods of family assessment, including self-report questionnaires, clinical interviews, behavioural observations in laboratory interactions, and naturalistic home observations. A major element of this project involves the refinement

and evaluation of the FAM Interview and Rating Scale.

These family assessment methods (FAM Questionnaire, Interview and Rating Scale) will provide carefully validated instruments for basic research and clinical studies on relationships between the family and alcohol/drug use and abuse.



H.A. Skinner

### Selected Publications

- Skinner, H.A. "Self-report Instruments for Family Assessment." In *Family Interaction and Psychopathology: Theories, Methods and Findings*, ed. Jacob, T. New York: Plenum Publishing Corp., 1987.
- **Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** H.A. Skinner, with T. Jacob (University of Arizona), P. Steinhauer (Hospital for Sick Children, Toronto) and M. Cierpka (University of Ulm, West Germany)

### 50

## Development of the Time-line Method for Assessing Alcohol Consumption

The time-line method of assessing alcohol consumption asks subjects to recall their actual drinking for a specified period. A calendar is used as an aid, as are certain memory prompts (e.g., remembering what they were doing around the time of important dates or events; reporting any pattern to their drinking). The method has been established as reliable with alcoholics, problem drinkers and normal drinkers. It is the only technique to be evaluated across this breadth of populations, and its validity has also been more thoroughly examined than any other similar technique.

### Research

1. In 1987-1988 the reliability of the method was established for the only major subpopulation of drinkers for which an evaluation had been lacking – normal drinkers in the general population (rather than students). This evaluation also found high reliability coefficients in line with previous research with other populations.

2. Using data derived from other studies, the relationship between scales purported to assess alcohol dependence severity and reports of drinking behaviour is being examined.

Subjects' drinking behaviour as reported by time-line is being compared with their scores on the Alcohol Dependence Scale (ADS) and the Michigan Alcoholism Screening Test (MAST).

3. The time-line method was also evaluated in a student research project conducted at the University of Toronto under the supervision of Dr. M.B. Sobell. Studies in this project found good reliability for the time-line method, but found that compared to a self-monitoring procedure, students occasionally would forget to report a day of drinking on the time-line.

However, for the days reported (the vast majority of all days), the level of drinking reported did not differ between the two methods.

### Implications

The ultimate outcome of this program is to make available for purchase a fully interactive computer program for gathering time-line data. A manual describing use of the time-line is being developed and will be available from the ARF. The manual and computer program will be valuable for clinical and research programs desiring more detailed drinking reports than usually available, gathered by a validated method.

**Selected Publications**

- Sobell, L.C., M.B. Sobell, G.I. Leo and A. Cancilla. "Reliability of a Time-line Method: Assessing Normal Drinkers' Reports of Recent Drinking and a Comparative Evaluation Across Several Populations." *British Journal of Addiction* 1988; 83: 393-402.
- Sobell, M.B., L.C. Sobell, F. Klajner, D. Pavan and E. Basian. "The Reliability of a Time-line Method for Assessing Normal Drinker College Students' Recent Drinking History: Utility for Alcohol Research." *Addictive Behaviors* 1986; 11: 149-162.

**Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** L.C. Sobell and M.B. Sobell

91

**Assessment of Opioid-dependent Patients for Methadone Treatment**

Assessment of opioid-abusing patients for methadone treatment can be difficult, especially if the individual exaggerates the severity of drug use, drug-related problems, and drug withdrawal. Additionally, the clinician must decide what dose of methadone would be appropriate. An objective procedure for assessing patients' physical dependence prior to the start of methadone is required. Up to 40 per cent of patients applying for this treatment have no, or only minimal, physical dependence of the opioid type.

The objective of this research is to develop and evaluate a reliable and valid procedure for the assessment of physical dependence in opioid-abusing patients. Such a procedure will enable physicians to screen outpatients with minimal or no dependence and to optimize the use of methadone in the treatment of those patients requiring the drug treatment.

**Research**

The present line of research is based on the systematic evaluation of patients' opioid dependence prior to starting methadone treatment in the Drug Therapy Clinic of ARF's Clinical Institute. The Clinical Institute Narcotic Assessment (CINA) procedure with naloxone is used to screen out nondependent patients, and to assist in the tailoring of the methadone dose for each patient according to the level of physical dependence. A significant correlation was found between the CINA score and final dose of methadone required to provide symptomatic relief. Since approximately 40 per cent of the patients had minimal dependence, use of the CINA is recommended as part of the preliminary assessment of patients applying for methadone treatment.

**Implications**

There is considerable debate in the addictions treatment field concerning the development of iatrogenic dependence on methadone in nondependent persons. A second topic of debate is how much methadone to prescribe. Work conducted in this program will contribute to these ongoing concerns. In particular, the assessment information derived from the study should serve as a guide for determining the starting methadone dose.

**Selected Publications**

- Peachey, J.E. "The Role of Drugs in the Treatment of Opioid Addicts." *Medical Journal of Australia* 1986; 145: 395-399.
- Peachey, J.E. "Guidelines for the Treatment of Opioid Withdrawal" and "Drugs in the Treatment of Opioid Dependence." Submitted to Expert Advisory Committee on the Use of Drugs in the Treatment of Abuse and Dependence of Narcotic and Controlled Drugs, Health Protection Branch, Health and Welfare Canada, Ottawa, Ontario, September, 1988.
- Peachey, J.E. and T. Franklin. "Methadone Treatment in Canada: The Clinical Questions Continue." *Canadian Medical Association Journal* 1988; 138: 17-19.

- Peachey, J.E. and H. Lei. "Assessment of Opioid Dependence with Naloxone." *British Journal of Addiction* 1988; 83: 193-201.

**Biomedical Research (Clinical Institute Division)**

**Investigators:** J.E. Peachey with H. Lei

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**Assessment of the Reliability and Validity of a Computerized Diagnostic Interview on Patients with Substance-use Disorders**

Patients with substance-abuse problems often show high rates of psychiatric disorders. Diagnosis of these disorders has often proved difficult since drug intoxication and withdrawal produce symptoms that often mimic other psychiatric conditions. Recent developments in psychiatric research methodology may contribute to improvements in the diagnoses of such dual disorders. The reliability and validity of several widely used structured diagnostic interviews have been extensively examined in psychiatric and community populations. Less work has been conducted regarding the utility of specific instruments in substance abuse populations.

This study will critically assess the performance in a substance-abuse treatment population of two recently developed interviews designed to diagnose mental disorders according to the revised American Psychiatric Association's DSM-III criteria. DSM-III-R has made substantial changes to criteria for substance-use disorders. The study will also be of use in validating the results of previous epidemiologic research using the DIS in substance-use populations.

**Research**

A sample of 200 patients with alcohol and/or drug problems, drawn from the Addiction Research Foundation's Clinical Institute and the Salvation Army's Harbour Light Centre in Toronto, will be studied. The utility of a computer-administered interview in screening for the presence of specified mental disorders in patients with alcohol and drug problems will be assessed. The inter-rater reliability and the validity of the forthcoming revised computerized version of the National Institute of Mental Health Diagnostic Interview Schedule (C-DIS-R) will be determined.

The reliability will be tested using a one-week test-retest design. The validity of the interview will be determined by comparing the psychiatric diagnoses generated by the computer with those given by psychiatrists using the new Structured Clinical Interview for DSM-III-R (SCID). Consensus diagnoses will be based on independent administrations of the SCID by two psychiatrists, as well as patient chart data and a psychoactive drug abuse history.

**Implications**

The identification and treatment of a coexisting psychiatric disorder in a substance-abusing patient will improve the treatment and prognosis of the alcohol or drug disorder as well as the psychiatric disorder. The diagnosis and classification of substance use and other mental disorders will also contribute to knowledge of use and problem patterns. Such knowledge is vital in the development of appropriate and cost-effective treatments.

In addition, this study will be of use in determining the reliability and validity of a self-administered computerized diagnostic interview in the psychiatric

assessment of patients with substance-abuse problems.



H.E. Ross

**Grants**

Work in this program is supported by a grant from the National Health Research and Development Program, Health and Welfare Canada.

**Biomedical Research (Clinical Institute Division)**

**Investigators:** H.E. Ross, with R. Swinson, B.A.T. Pederson, W.T. Hwang and E.J. Larkin

**93****The Epidemiology of Psychiatric Disorders in Patients with Alcohol and Drug Problems**

Research suggests that patients with alcohol and drug problems have a high risk of other psychiatric disorders (such as anxiety and depressive disorders) that are difficult to diagnose and treat. In assessing substance-abuse patients, treatment personnel need to be aware of the different patterns of coexisting psychiatric disorders in men and women. This research is investigating the prevalence of such dual disorders in a substance-use-disorder treatment population to facilitate recognition and treatment.

State-of-the-art psychiatric diagnostic techniques are used. Particular attention is paid to sex differences in the prevalence of dual disorders. There has been little previous work on sex differences in concurrent mental disorders in alcohol and drug patients. In addition, the use of self-report rating scales in screening for psychiatric disorders in substance-abuse populations has received little attention to date.

**Research**

Five hundred and one patients with alcohol and drug problems were evaluated for lifetime and current prevalence of mental disorders. The National Institute of Mental Health Diagnostic Interview Schedule (NIMHDIS) was used, and computer diagnoses were generated according to DSM-III criteria. A large proportion of patients (78 per cent) had at some time in their lives met accepted diagnostic criteria for mental disorders. Current disorders were diagnosed in 65 per cent of the sample. The most common lifetime disorders were generalized anxiety, antisocial personality, phobias, psychosexual dysfunctions, major depression and dysthymia. Patients who abused both alcohol and drugs were the most psychiatrically impaired; patients with DIS psychiatric disorders had more severe alcohol and drug problems.

Female patients were oversampled to examine sex differences in the prevalence of psychiatric disorders. The female patients did not show higher overall rates of psychiatric disorder than did the male patients. While there were no significant sex differences in the major mental disorders, women were more likely to suffer from anxiety, psychosexual disorders and bulimia, while men were more often diagnosed as having anti-social personality disorders. These findings challenge the widespread belief among professionals that female substance abusers manifest more psychopathology and maladjustment than do their male counterparts.

**Implications**

The traditional division of mental health and substance-abuse treatment facilities has often meant that substantial numbers of patients with alcohol and drug problems do not receive

adequate treatment for concurrent psychiatric disorders. This research will help facilitate the recognition of dual disorders and thereby promote the development of more effective treatment interventions for affected individuals. Further studies will examine the prevalence of dual disorders in other patient populations (e.g., a university mental health clinic).

#### **Selected Publications**

- Ross, H.E., F.B. Glaser and T. Germanson. "The Prevalence of Psychiatric Disorders in Patients with Alcohol and Other Drug Problems." *Archives of General Psychiatry*, 1988; 45: 1023-1031.
- Ross, H.E., F.B. Glaser and S. Stiasny. "Sex Differences in the Prevalence of Psychiatric Disorders in Patients with Alcohol and Drug Problems." *British Journal of Addiction*, 1988; 83: 1179-1192.

#### **Biomedical Research (Clinical Institute Division)**

**Investigators:** H.E. Ross with F.B. Glaser

94

#### **A Field Trial of ICD-10, Chapter V, Mental Disorders**

The World Health Organization (WHO) invited the Addiction Research Foundation to take part in field trials for Chapter V, Mental Disorders, of the *Tenth Revision of the International Classification of Diseases (ICD-10)*, which is now in preparation. The current version, *ICD-9*, or a U.S. modification, is currently used by Statistics Canada and all Canadian provinces for cause-of-death and morbidity reporting. Chapter V, "Mental, Behavioural and Developmental Disorders", has been extensively revised, and the classification of substance-abuse disorders has undergone significant modification. ARF is particularly well suited to serve as a centre for testing the reliability of Chapter V, mental disorders.

#### **Research**

The objectives of the WHO-sponsored field trials were as follows:

- to assess the ease of understanding and ease of use of *ICD-10*, Chapter V
- to assess the extent to which the new classification describes adequately the disorders of various types of psychiatric patients
- to provide information on the extent and types of agreement achieved between independent diagnosticians.

Three psychiatrists and a psychiatric resident took part in the field trial that consisted of five phases: 1) familiarization; 2) preparation of case summaries on four patients; 3) joint assessment of 18 patients using an interviewer-observer design; 4) assessment of 10 case summaries from other field trial centres, and; 5) comments and discussion.

The data collected have been sent to the field trial coordination centre in Rockville, Maryland for analysis.

#### **Implications**

The results of the field trials will be used to implement changes in the draft version of *ICD-10*, Chapter V, to make it more acceptable and useful to clinicians. A later research version of *ICD-10*, Chapter V will be forthcoming. The ongoing development of an international classification of disease will facilitate international comparisons of epidemiological data on mental and behaviour disorders, including those due to psychoactive substance use.

#### **Biomedical Research (Clinical Institute Division)**

**Investigators:** B.A.T. Pedersen with H.E. Ross

#### **Sociobehavioural Research**

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#### **Coping Skills and Relaxation Training**

The cognitive-behavioural approach to stress management is extensively employed as a clinical intervention for substance abusers. However, its applications and formats differ widely, and there is little data from controlled studies regarding its effects. Relaxation training techniques, especially progressive muscular relaxation and meditation, have been subjected to considerable empirical scrutiny, but many of the studies were methodologically flawed. Most research has involved subjects other than substance abusers; thus, the results cannot be readily applied to this population.

The objective of this research program is to evaluate the extent to which structured, group training in cognitive and behavioural coping skills enhances the effectiveness of brief, advice-oriented counselling.

#### **Research**

Adult, primary alcohol-using clients are randomly assigned to one of four treatments in a controlled clinical trial. Specifically, the study compares the relative effectiveness of

- primary care sessions plus a stress management program comprising a generic set of cognitive strategies aimed at the identification of natural stressors, their cognitive-social-behavioural concomitants, and adaptive coping patterns
- primary care sessions plus the stress management program, com-

bined with training in progressive muscular relaxation

- primary care sessions plus the stress management program combined with training in Benson's meditation-relaxation, a long-established and well known relaxation technique
- primary care sessions alone.

Groups of six subjects are randomly assigned to one of the four treatments. The primary care component consists of three outpatient sessions over a 12-week period. The stress management component consists of 11 outpatient sessions over 12 weeks. A follow-up assessment is conducted at six, twelve and eighteen months following entry into treatment.

Preliminary findings show that patients high in perceived control (designated *internals*) responded well to brief, nondirective counselling, as they did to more intensive structured interventions. People who believe that they exert independent control over their lives and their health can begin to make meaningful changes in areas of functioning related to health status with only a minimum of encouragement, guidance and support. On the other hand, persons low in perceived control (so-called *externals*) require more structure, direction and support in order to initiate and maintain health-related changes in behaviour.

### Implications

Information derived from this study could assist clinicians to select interventions from the several stress-oriented treatment options available and help refine and optimize treatment strategies further. In addition, this work will assist in matching the type of client with the type of treatment. In 1988-90 the follow-up phase and data analysis will be conducted.



M. Krywonis

### Selected Publications

- Hartman, L., M. Krywonis and E. Morrison. "Psychological Factors and Health-related Behaviour Change: Preliminary Findings from a Controlled Clinical Trial." *Canadian Family Physician* 1988; 34: 1045-1049

### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** M. Krywonis and L. Hartman, with F. Klajner, M.B. Sobell, L. Sagorsky, W. Skinner and E. Morrison

96

## Conceptual Issues in Treatment Outcome Evaluation

It is now broadly acknowledged that there is wide heterogeneity among alcoholics. Whereas a patient with one set of characteristics may respond favourably to one type of treatment, a patient with another set of characteristics may respond more favourably to another treatment approach.

Consequently, there is a growing consensus in the field that it is unlikely that a single treatment will be found that will be effective for all alcoholics. There is also general agreement that patient-treatment matching has potential for improving outcome results.

The temporal stability of treatment outcome results has received relatively little attention in the addictions field. This is an important issue, since instability in outcome results over time could have far-reaching implications in the interpretation of outcome rates across studies and in the generalization of findings concerning client prognostic characteristics in outcome.

### Research

1. Client-Treatment Matching. The objective of this line of research is to further the understanding of matching

effects in the treatment of alcohol and drug abusers. The literature was reviewed for studies that provide evidence for successful patient-treatment matching effects. It was concluded that studies showing the largest effect sizes associated with matching tend to be those in which the choice of client- and treatment-matching dimensions are theoretically driven. Further, it was concluded that such matching effects can make a substantial contribution to explaining treatment outcome variance.

### 2. The Temporal Stability of Treatment Outcome Results.

Data from the ARF's Clinical Institute cross-study data base were used to evaluate the degree of individual stability (constancy in outcome status of individuals over time) and group stability (invariance in aggregate outcome status within a treatment group over time) of outcome results in a sample of 222 male and female alcoholics admitted to the Clinical Institute's outpatient department. All 222 clients included in the study sample had completed at least three outpatient appointments and had participated in individual follow-up interviews three, six and twelve months following treatment.

The data from this sample are being examined for the degree of group and individual stability shown across the three time periods on the following outcome measures: typical quantity of alcohol consumed, typical frequency of use and total alcohol consumed.

### Implications

Successful patient-treatment matching shows promise in improving the chances of positive treatment outcomes and ensuring the efficient utilization of treatment resources. Further studies will be undertaken periodically of matching effects re-

ed in the literature. The work on temporal stability of treatment outcome results will have bearing on the limits of generalization of outcome findings.

#### Selected Publications

- Annis, H.M. "Patient-treatment Matching in the Management of Alcoholism." In *Treatment of Chemical Dependence*, ed. O'Brien, C.P. N.I.D.A. Monograph Series, forthcoming.
- Annis, H.M. "Is Inpatient Rehabilitation of the Alcoholic Cost-effective? Con Position." *Advances in Alcohol and Substance Abuse* 1986; 5: 175-190. Reprinted in *Controversies in Alcoholism and Substance Abuse*, ed. Stimmel, B. New York: Haworth Press, 1986.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigator:** H. M. Annis

97

#### Relapse-prevention Training

The high rate of relapse of alcoholic clients following discharge from treatment is a major concern to professionals working in the addictions field. Therefore, there is a need to develop treatment strategies that promote longer-term maintenance of changes in drinking behaviour among alcoholic clients following discharge from treatment.

Bandura's theory of self-efficacy suggests that intervention procedures that are powerful in the initiation of a change in behaviour may not be those that are most effective in promoting a lasting change in behaviour. Self-efficacy theory provides a framework for the development of relapse-prevention procedures – that is, for the development of treatment strategies with a high potential for the maintenance of behaviour change.

#### Research

Based on principles of social learning theory, specifically Bandura's theory of self-efficacy, a relapse-prevention

training program for alcoholics has been developed. A profile of the types of situations that have resulted in heavy drinking by the client over the past year is constructed using the *Inventory of Drinking Situations* (see Research Entry #86). In addition, the client's efficacy expectations (or relative confidence level) in being able to cope with each of these situations in the future are assessed using the *Situational Confidence Questionnaire*. Therapy focuses on having the client engage in performance-based homework assignments in areas that have been identified as high-risk drinking situations. The aim of treatment is to effect a rise in self-efficacy across all areas of perceived drinking risk.

In a randomized control trial, 82 clients seeking treatment in ARF's Clinical Institute received either relapse-prevention procedures or more traditional methods of aftercare. Drinking situations associated with negative emotional states were shown to be most likely to result in serious relapse. Self-efficacy ratings at intake within different drinking risk areas were able to predict the specific nature of the situations in which relapse to heavy drinking would most likely occur during aftercare. Outcome comparisons between the two treatment conditions are under way.

In a second randomized control trial, clients seeking treatment in the Clinical Institute received either eight outpatient counselling sessions involving a prescription for the drug Temposil® (calcium carbimide, an alcohol-sensitizing drug) together with general advice from a physician, or were given instruction on the use of Temposil® in conjunction with relapse prevention homework assignments. Analysis of follow-up data from this trial will commence in the fall of 1988.

#### Implications

This research will continue to refine the implementation of relapse-prevention procedures, taking into account these findings as well as those of other investigators. Two refinements planned include the incorporation of the client's outcome expectancies in the design of the treatment plan, and the more systematic assessment and use in treatment planning of the client's coping repertoire and sources of social support. The work will assist ongoing efforts to prevent relapse among alcoholic clients.

#### Selected Publications

- Annis, H.M. "A Relapse Prevention Model for Treatment of Alcoholics." In *Treating Addictive Behaviours*, eds. Miller, W.R. and N. Heather. New York: Plenum Publishing Corp., 1986: 407-433.
- Annis, H.M. and C.S. Davis. "Relapse Prevention." In *Handbook of Alcoholism Treatment Approaches*, eds. Hester, R.K. and W.R. Miller. New York: Pergamon Press Inc., forthcoming.
- Annis, H.M. and C.S. Davis. "Relapse Prevention Training: A Cognitive-behavioural Approach Based on Self-efficacy Theory." *Journal of Chemical Dependency Treatment*, in press
- Peachey, J.E. and H.M. Annis. "The Effectiveness of Aversion Therapy Using Disulfiram and Related Compounds." In *Human Metabolism of Alcohol*, eds. Batt, R.D. and K. Crow. Boca Raton, Florida: CRC Press Inc., forthcoming.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** H.M. Annis with J.E. Peachey

98

#### Guided Self-management Treatment

Previous studies at the ARF have found short-term outpatient treatments to be effective for problem drinkers who are not severely dependent on alcohol. The Guided Self-management Treatment Research Project involves testing the compara-

tive efficacy of two short-term outpatient treatments developed specifically for problem drinkers who wish to take major responsibility for implementing their own treatment.

Both treatments are cognitive-behavioural and emphasize helping people learn to analyze their drinking problems and develop coping alternatives that capitalize on their own personal strengths and resources. One version includes a relapse-prevention component whereby clients are encouraged to view recovery from a long-term perspective, to interrupt slips as soon as possible, and to construe slips as unfortunate learning experiences rather than as personal failures.

### **Research**

This research program is evaluating the effectiveness of these two treatments by assessing and treating 100 clients (50 randomly assigned to each treatment) and measuring their outcome over two years. By the end of 1988, all clients are expected to have completed the treatment phase of the study. Treatment is conducted by the investigators and by Clinical Institute outpatient therapists.

Follow-up is now in progress, and treatment outcome findings are not yet available. An early finding based on project assessment data is that a substantial proportion of the problem drinkers in this study report that their heavy drinking occurred primarily when they were feeling good, especially when in the company of others, rather than when they were feeling bad.

### **Implications**

The treatments being tested in this study could be readily assimilated by community treatment agencies. They involve brief readings and homework assignments that have been field

tested. The procedures have been employed by regular clinical treatment staff, and staff would require little training if they are familiar with behavioural treatment methods.

The preliminary finding that many problem drinkers report drinking heavily to enhance a positive emotional state suggests that new treatment methods need to be developed for such individuals. Most existing treatments are based on the notion that excessive drinking is an inappropriate coping response.

Further research (e.g., possibly developing treatments for *good times* drinkers) will be planned after follow-up data have been analyzed.

#### **Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** M.B. Sobell and L.C. Sobell with W. Skinner

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### **Spousal Social Support Study**

The literature suggests that social support is an important environmental resource that is associated with successful outcomes for some alcohol abusers. It has been hypothesized that social support acts as a buffer against negative life events and also reinforces maintenance of positive lifestyle change. Most studies have been correlational in nature and retrospective rather than clinical trials. The present study is a prospective clinical trial aimed at evaluating whether treatment effectiveness can be improved by systematically incorporating spousal social support as a component of treatment.

### **Research**

The effects of spousal social support are being studied through treatment research involving married alcohol

abusers whose spouses are willing to be involved in the treatment program. One hundred subjects are being treated. The study is evaluating the comparative efficacy of a cognitive-behavioural relapse prevention program involving two levels of spousal social support, with subjects randomly assigned to one of the two conditions (30 to each group):

1. Natural Social Support: Spouses in this group are provided with an understanding of their spouses' treatment and a realistic understanding and perspective on the long-term nature of the recovery process.
2. Directed Social Support: Spouses in this group are given the same information as those in the Natural Social Support Group. In addition, it is stressed to spouses that
  - they should act as continuing agents of treatment
  - they should take personal roles in assisting their spouses' recovery
  - they should be supportive of their partners' efforts to resolve their drinking problems
  - their understanding of the recovery process and how they respond to slips are important factors to long-term recovery.

Treatment outcome will be evaluated by following up subjects for two years after completion of formal treatment.

### **Implications**

Alcohol problems affect the family as well as the alcoholic. If the sessions conducted with spouses in this study are well received by the spouses, they could readily be used by programs in the community. If it is found that subjects in the *directed* group have a better outcome than subjects in the *natural support* group, this would suggest that spouses could play an active role in assisting the recoveries of problem

drinkers. Specific intervention procedures, which include handouts of written information, could easily be incorporated into existing community treatment programs.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.C. Sobell and M.B. Sobell

### 100

#### Conjoint (Spouse-involved) Therapy for Alcoholism

Family therapy approaches, based in many instances on systems theory, have become more common in the treatment of alcohol-related problems. The basic premise of systems theory is that behaviour can best be understood and changed by focusing on the interpersonal context in which that behaviour occurs. More specifically, systems-based marital or family therapy attempts to deal simultaneously with drinking problems and the family dynamics that are associated with the drinking. At the present time, a number of different interventions involving the family or spouse of the problem drinker are being offered, although there are relatively few studies supporting the effectiveness of such approaches.

#### Research

The Marital Systems Study was conducted to evaluate and compare the relative effectiveness of two systems-based interventions: an eight-session outpatient treatment program and a single-session program. Both treatments involved the spouse actively in the course of treatment. Eligible couples were assessed thoroughly, randomly assigned to one of the treatments and then followed up over a

period of 18 months. In all, 218 couples began the study, with 116 couples completing all treatment and follow-up sessions.

The results indicated couples in each of the treatment conditions showed significant improvement in both drinking and marital adjustment; these changes were relatively stable over the entire follow-up period. There was, however, no indication that the more intensive treatment was more effective than the alternative of a single session.

#### Implications

The results of this study provide further evidence of the effectiveness of very brief treatments involving the spouse for individuals with moderately severe alcohol-related problems and marital distress. Such findings should help shape the treatment programs of the ARF Clinical Institute and also have an impact on the development of community-based treatment programs for this patient population.

Further analyses of the data will address such issues as whether subjects who were recruited to the study by means of advertisements differed from subjects who were recruited directly from the Clinical Institute.



S. Pearlman

#### Selected Publications

- Pearlman, S. "Systems Theory and Alcoholism." In *Theories on Alcoholism*, eds. Chaudron, C.D. and D.A. Wilkinson. Toronto: Addiction Research Foundation, 1988: 289-324.
- Zweben, A., S. Pearlman and S. Li. "A Comparison of Brief Advice and Conjoint Therapy in the Treatment of Alcohol Abuse: The Results of the Marital Systems Study." *British Journal of Addiction*, 1988;83: 899-916.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** A. Zweben, S. Pearlman and S. Li

### 101

#### The Nature and Treatment of Multiple-substance Abuse

Multiple-drug dependence is a prevalent and increasing problem among persons receiving treatment – particularly youth. To date, the phenomenon has not been well described. Further, there have been no controlled studies of treatment effectiveness with this population. The objectives of this ongoing research program are to assess, treat and evaluate the effectiveness of treatment for young persons with problems of multiple-substance abuse.

#### Research

Young drug abusers were assessed and randomly assigned to two treatment programs. One was a comprehensive broad-spectrum residential program (three to six weeks) and the other a brief, focused, outpatient treatment (three treatment sessions). The residential program had two versions: one encouraged a collective therapeutic effort by the client group, and the second rewarded individual client performance. Clients were followed up for two years. On the basis of these activities, objective descriptions of the nature of drug problems in youth and young adults, and information about treatment effectiveness with this population have been generated. Results indicate that the treatment system rewarding collective therapeutic effort by the clients yielded a superior outcome to the other two treatment conditions.

The program also revealed four major dimensions of drug use among young people with drug problems in Ontario: alcohol; cannabis/hallucinogens/stimulants; narcotic analgesics/sedative hypnotics/tranquil-

lizers; and solvents. Further analysis revealed that these dimensions of drug use underlie five distinct types of young drug user. The clinical significance of these dimensions and typologies require further investigation.

A number of other findings are also significant:

1. Generally, young drug users in the project provided valid reports of their drug use to project staff. This finding is important because there is scepticism about self-reports of drug use, the main source of clinical information about client behaviour.
2. Examination of the process variables in the outpatient group revealed that information predictive of unsuccessful outcome at follow-up is frequently available early in the treatment process. This indicates that treatment strategies could be modified on the basis of such information, in order to reduce rates of treatment failure.
3. The project has shown that multiple-drug use in youth involves lower levels of use than that among young adults, and tends to emphasize a different type of use. Females are more common in the youth group.
4. Many of the clients, especially females, reported having a substance-abusing parent. The drug problems of these clients were most commonly associated with alcohol and drugs in the depressant dimension.

In addition to these activities, a review of the relevant treatment literature has been conducted and a project on client self-efficacy has been planned.

### **Implications**

The therapeutic procedure yielding the best outcome has been incorporated into the Young Drug Users Program of the ARF Youth Clinic. Results of the study have helped in the planning of the Youth and Drugs Project, which is

currently in progress. A number of the assessment procedures developed for the program have been incorporated into some ARF clinics, as well as in a modified form of ASIST (A Structured Interview for Selecting Treatment; see Research Entry #81). They have also been adopted in other research projects and programs in Ontario, other provinces and other countries. In collaboration with the Brazilian Ministry of Health, the outpatient program is being adapted for use with cocaine users in Sao Paulo. Findings from this program have also shaped the project Patterns of Drug Use and Their Correlates, which is currently in progress.

Research on multiple-drug-using clients of the Clinical Institute will continue, with a major emphasis to be placed on the study and treatment of heavy users of cocaine.

### **Selected Publications**

- Cordingley, J., D.A. Wilkinson and G.W. Martin. "Corroborating Multiple Drug Users' Self-reports by Collaterals." *Behavioral Assessment*, in press.
- Martin, G.W., D.A. Wilkinson and B.M. Kapur. "Validation of Self-reported Cannabis Use by Urine Analysis." *Addictive Behaviors* 1988; 13: 147-150.
- Wilkinson, D.A. and S. LeBreton. "Early Indications of Treatment Outcome in Multiple Drug Users." In *Treating Addictive Behaviors*, eds. Miller, W.R. and N. Heather. New York: Plenum Publishing Corporation, 1986; 239-261.
- Wilkinson, D.A., G.M. Leigh, J. Cordingley, G.W. Martin and H. Lei. "Dimensions of Multiple Drug Use and a Typology of Drug Users." *British Journal of Addiction* 1987; 82: 259-273.

### **Sociobehavioural Research (Clinical Institute Division)**

**Investigators:** D.A. Wilkinson and G.W. Martin, with J. Cordingley, B.M. Kapur, S. LeBreton, H. Lei and G.M. Leigh

### **102**

### **Brief Treatments for Alcohol and Drug Problems**

Persons with a less severe problem constitute a majority of the problem drinking population. Treatment outcome studies have shown that this population can be treated effectively by brief interventions. In fact, these individuals prefer brief treatments and frequently refuse intensive interventions. The rate of natural resolution among this group is also likely to be high. Because treatment resources are limited, it is imperative to develop cost-effective interventions for the secondary prevention of alcohol and drug problems among this population.

The brief treatments used in this program are the end product of 15 years of clinical research with populations with various levels of dependence. The treatments consist of cognitive and behavioural techniques that focus directly on the problem behaviour (i.e., alcohol and/or drug use) and are described in M. Sanchez-Craig's *A Therapists' Manual for Secondary Prevention of Alcohol Problems: Procedures for Teaching Moderate Drinking and Abstinence* (Toronto: Addiction Research Foundation, 1984). The objective of the current research is to assess inexpensive variants of the techniques described in this manual.

### **Research**

1. Treatment of Benzodiazepine Dependence. Long-term users of therapeutic doses of benzodiazepines were withdrawn using diazepam or placebo tablets in a double-blind trial. Average treatment involved five one-hour outpatient sessions, and subjects were followed over one year. At the end of treatment no significant differ-

ences were observed in rates of attrition or in rates of abstinence. However, compared to drug subjects, those withdrawn with placebo were significantly more successful in maintaining abstinence throughout the one-year follow-up period. Another finding was that an inexperienced therapist became as effective as a highly experienced therapist relatively quickly, thus indicating transferability of the treatment.

**2. Brief Treatment for Alcohol Problems:** Ninety early-stage problem drinkers were randomly assigned to a brief treatment provided in three different forms:

- **Guidelines:** in three 30-minute sessions subjects were given a pamphlet describing simple steps for achieving abstinence or moderate drinking.
- **Manual:** in three 30-minute sessions subjects were given a self-help manual outlining procedures for achieving abstinence or moderate drinking.
- **Therapist:** in six one-hour sessions, subjects were instructed on the elements of a self-help manual.

No significant differences were found among the groups in drinking measures obtained after three, six and twelve months. Heavy drinking days were reduced by about 50 per cent, and the mean weekly consumption decreased from 33 to 18 drinks.

Women, however, were significantly more successful than men in achieving moderate drinking, particularly in the *guidelines* (60 per cent vs. 33 per cent) and the *manual* conditions (63 per cent vs. 18 per cent). In the *therapist* condition, about one-third of men and women were rated as successful.

**3. Brief Treatment for Alcohol Problems: Replication.** The above study with early-stage problem drinkers is now being replicated, with a longer follow-up period. The main

objectives are: (a) to assess whether the sex differences found in the earlier study persist and, (b) to determine whether the treatments can be transferred to individuals who are knowledgeable about problems of addiction, but who have no experience in therapy. Subjects have been treated and are now in the first follow-up phase. The findings should be available by 1990.

### Implications

Findings of this research program lend support to the notion that persons with a less severe problem do not require intensive interventions. Moreover, the research has shown that the brief treatments can be transferred readily to health professionals without formal training in psychotherapy, provided that they: (a) have an ideology that permits flexibility of choice of either abstinence or moderate drinking, (b) believe in the appropriateness of offering brief interventions; and (c) have skill in applying methods of self-control.

Future plans include two studies to assess the self-help materials in the community, without therapist contact. The subjects will be media-recruited drinkers wishing to reduce their alcohol consumption through their own efforts.



M. Sanchez-Craig

### Selected Publications

- Sanchez-Craig, M. *Dealing with Drinking: Steps to Abstinence or Moderate Drinking*. Toronto: Addiction Research Foundation, 1987.
- Sanchez-Craig, M., H. Cappell, U. Busto and G. Kay. "Cognitive-behavioural Treatment for

Benzodiazepine Dependence: A Comparison of Gradual Versus Abrupt Cessation of Drug Intake." *British Journal of Addiction* 1987; 82: 1317-1327

- Sanchez-Craig, M. and D.A. Wilkinson. "Treating Problem Drinkers Who Are Not Severely Dependent on Alcohol." *Drugs and Society* 1987;

1: 39-67.

- Sanchez-Craig, M., D.A. Wilkinson and K. Walker. "Theory and Methods for Secondary Prevention of Alcohol Problems: A Cognitively Based Approach." In *Treatment and Prevention of Alcohol Problems: A Resource Manual*, ed. Cox, M.W. New York: Academic Press Inc., 1987: 287-331.

### Grants

The replication study is supported by a grant from the U.S. National Institute on Alcohol Abuse and Alcoholism.

### Sociobehavioural Research (Clinical Institute Division), in collaboration with Education Resources Division

**Investigators:** M. Sanchez-Craig, with U. Busto, H. Cappell, H. Lei, G. Leigh, K. Spivak, T. Hunt and D.A. Wilkinson

## Biochemical and Biomedical Research

**103**

### Research on the Basis of the Treatment of Liver Disease

Alcoholic liver disease affects about 20 to 80 per cent of alcoholics, depending on the level and duration of alcohol consumption. World-wide, more than 100,000 people die each year of cirrhosis of the liver. The objective of this program is to study the pathogenesis of alcohol-related liver disease and to provide treatment. In relation to treatment, the antithyroid drug propylthiouracil (PTU) has been tested in a large clinical trial. This drug was previously demonstrated in this institution to be effective in protecting against liver damage in animals. (See Research Entry #61 for a description of related work.)

#### Research

Six related lines of research are currently active:

1. PTU was shown to reduce mortality due to alcoholic liver disease by 50 to 60 per cent. The optimal dose of PTU is now being determined by measuring serum TSH concentrations. In addition, the most appropriate dosage in relation to severity of alcoholic liver disease and to different degrees of alcohol intake are being established.
2. It has been observed that PTU induces an increase in portal blood flow in the rat. This effect of PTU appears to be independent of its thyroid action and results in an increased delivery of oxygen to the liver. This study could shed light on another reason why PTU improves the prognosis of patients with alcoholic liver disease.
3. In collaboration with Dr. O. Niemelä of Oulu University, Finland, the effect

of PTU on fibrogenesis is being studied. This information is of great importance, as the accumulation of fibrous tissue (measured by collagen type IV and laminin), is one of the most important determinants of severity of alcoholic liver disease.

4. The alcohol-induced compensatory increase in liver blood flow is being studied. This mechanism, which increases the delivery of oxygen to the liver, could be of importance in preventing the hypoxic liver induced by alcohol. The mechanism of this response and the factors that might interfere with it are being determined.
5. Alcohol in patients with portal hypertension could produce an increase in the portal blood flow and in bleeding from esophageal varices. Studies in rats with experimentally induced portal hypertension have been designed to determine the effects of alcohol on portal pressure and on blood flow through the porto-systemic shunts.
6. It has been found that the compensatory increase in portal blood flow that follows alcohol administration is adenosine-mediated. This increase in portal blood flow increases the delivery of oxygen to the liver, compensating for the alcohol-induced increase in portal blood flow, an effect that prevents the production of hypoxic liver damage. Xanthines (such as caffeine) inhibit the response to adenosine by acting as antagonists on the adenosine receptors. Therefore, caffeine in combination with alcohol could result in hypoxic liver damage. This study has great potential importance, as alcoholics are known to consume large amounts of coffee.

#### Implications

Work in this program has led to major treatment developments for alcoholic liver disease. The effect of PTU in protecting against liver disease demon-

strates that previous basic research at the Institute has been of value. The widespread use of PTU should save a substantial number of lives and should also reduce health costs.

Future work will try to determine the most effective doses of PTU in the treatment of alcoholic liver disease and the effects of PTU on fibrogenesis. Work will also be conducted to determine the possible effects of caffeine in potentiating alcoholic liver damage.



H. Orrego

#### Selected Publications

- Blake, J.E., K.V. Compton, W. Schmidt and H. Orrego. "Accuracy of Death Certificates in the Diagnosis of Alcoholic Liver Cirrhosis." *Alcoholism: Clinical and Experimental Research*. 1988; 12(1): 168-172.
- Carmichael, F.J., V. Saldivia, G.A. Varghese, Y. Israel and H. Orrego. "Ethanol-induced Increase in Portal Blood Flow: Role of Acetate and A2 Adenosine Receptors." *American Journal of Physiology* 1988; 255: G417-G423.
- McKaigney, J.P., F.J. Carmichael, V. Saldivia, Y. Israel and H. Orrego. "Role of Ethanol Metabolism in the Ethanol-induced Increase in Splanchnic Circulation." *American Journal of Physiology* 1986; 250: G518-G523.
- Orrego, H., J.E. Blake, L.M. Blendis, K.V. Compton and Y. Israel. "Long-term Treatment of Alcoholic Liver Disease with Propylthiouracil." *New England Journal of Medicine* 1987; 317: 1421-1427.
- Orrego, H., J.E. Blake, L.M. Blendis and A. Medline. "Prognosis of Alcoholic Cirrhosis in the Presence and Absence of Alcoholic Hepatitis." *Gastroenterology* 1987; 92: 208-214.
- Orrego, H., F.J. Carmichael and Y. Israel. "New Insights on the Mechanism of the Alcohol-induced Increase in Portal Blood Flow." *Canadian Journal of Physiology and Pharmacology* 1988; 66: 1-9.

#### Grants

Work in this program is supported by grants from the Alcoholic Beverage Medical Research Foundation and The Physicians' Services Incorporated Foundation.

#### Gastroenterology Research (Clinical Institute Division), and Biochemical Research (Social and Biological Studies Division)

**Investigators:** H. Orrego, with J.E. Blake, F.J. Carmichael and Y. Israel

104

## New Pharmacological Treatments for Alcohol and Other Drugs of Abuse

No effective clinical pharmacotherapies for alcohol and other drugs are available. Disulfiram, which is widely used, was established as standard therapy long before rigorous randomized clinical trials were conducted. This program was established in 1981 to systematically study the effects of potential new pharmacotherapies for alcoholism in animal models and humans. This is the first such research program to be implemented in the world.

### Research

The program has developed the concept that alcohol consumption can be reduced with serotonin uptake inhibitors (e.g., zimelidine, citalopram, viqualine, fluoxetine) in early stage problem drinkers. This is the first demonstration of a group of centrally acting medications having such an effect.

Current work in this program is directed toward the demonstration of the effect of serotonin uptake inhibitors in combination with standard behavioural therapies. A series of studies has also been initiated to explore the potential effects of additional agents that interfere with other neurotransmitter systems to test their effects on alcohol consumption.

### Implications

Work in this program is making it possible to decrease alcohol consumption with an effective pharmacotherapy. One of the major achievements of the program has been to develop a set of procedures for testing and selecting drugs for further clinical development. An example of such an achievement is

the highly regarded work with serotonin uptake inhibitors. These results are expected to be of great interest to general practitioners who are the most likely users of these compounds.



E.M. Sellers

#### Selected Publications

- Lawrin, M.O., C.A. Naranjo and E.M. Sellers. "Identification and Testing of new Drugs for Modulating Alcohol Consumption." *Psychopharmacology Bulletin* 1986; 22(3): 1020-1025.
- Naranjo, C.A. "Current Trends in the Pharmacological Treatment of Alcohol-related Problems." *Australian Drug and Alcohol Review* 1988; 7: 93-98.
- Naranjo, C.A. and E.M. Sellers. "Serotonin Uptake Inhibitors Attenuate Ethanol Intake in Humans." *Australian Drug and Alcohol Review* 1988; 7: 109-112.
- Naranjo, C.A. and E.M. Sellers. "Clinical Trials for Testing New Drugs to Decrease Alcohol Consumption." *Pharmacology*, 1987; 73:7-740.
- Naranjo, C.A., E.M. Sellers, J.T. Sullivan, D.V. Woodley, K. Kadlec and K. Sykora. "The Serotonin Uptake Inhibitor Citalopram Attenuates Ethanol Intake." *Clinical Pharmacology and Therapeutics* 1987; 41: 266-274.
- Naranjo, C.A., J.T. Sullivan, M.O. Lawrin and E.M. Sellers. "Strategies for the Identification and Testing of New Pharmacological Modulators of Ethanol Consumption." In *Brain Reward Systems and Abuse*, eds. Engel, J., L. Orelan, D.H. Ingvar, B. Pernow, S. Rossner and L.A. Pelbom. New York: Raven Press, 1987: 129-145.
- Sellers, E.M. and C.A. Naranjo. "Therapeutic Use of Serotonergic Drugs in Alcohol Abuse." *Clinical Neuropharmacology* 1986; 9 (suppl.4): 60-62.
- Sellers, E.M. and C.A. Naranjo. "Interaction of Serotonin Uptake Inhibitors with Ethanol." *Australian Drug and Alcohol Review* 1988; 7:113-116.
- Wu, P.H., T. Fan and C.A. Naranjo. "Increase in the Brain Regional Depolarization-dependent Ca<sup>2+</sup> Uptake in Rats Preferring Ethanol." *Pharmacology Biochemistry and Behavior* 1987; 27: 355-357

#### Grants

The study of viqualine effects on ethanol intake in humans and animals is supported by a grant from Pharmuka Laboratories, France. The study of fluoxetine effects on ethanol intake in humans is supported by a grant from Eli Lilly & Co., U.S. The study of the effects of paroxetine in rats is supported by a grant from Beecham Laboratories Inc.

**Biomedical Research (Clinical Institute Division)**

**Investigators:** C.A. Naranjo and E.M. Sellers

105

## A Clinical Trial of Calcium Carbimide (Temposil®) in Chronic Alcoholics

The alcohol-sensitizing drug disulfiram (Antabuse®) is often prescribed to alcoholics to maintain abstinence. Unfortunately, there is no scientific evidence that the treatment is effective, and there is concern that disulfiram can produce adverse clinical effects in some patients. Calcium carbimide (Temposil®) is another alcohol-sensitizing drug with rapid-onset, short-duration action. Although calcium carbimide is available in many countries including Canada (but not the United States), there have been no controlled clinical trials to determine its efficacy and toxicity in chronic alcoholics.

The objective of this research is to establish the short-term efficacy and safety of calcium carbimide and to suggest the guidelines for its safe and effective use in alcoholism treatment.

### Research

A randomized double-blind, placebo-controlled clinical trial of calcium carbimide was conducted to evaluate short-term efficacy and clinical toxicity in alcoholic subjects. The study followed a single cross-over design with each subject receiving either the drug or placebo for 56 days, followed by the alternate treatment for another 56 days. Patients' compliance in taking the medication and drinking behaviour were monitored by daily self-reports and daily urine monitoring of the tablet marker riboflavin (test of compliance) and alcohol using the alcohol dipstick.

Half the subjects who completed the study abstained. There were highly significant reductions from pre-treatment to within-treatment for

drinking frequency, total quantity and typical daily quantity. Subjects took over 90 per cent of the prescribed medications. Subjects did not report more symptoms or encounter more medical problems with the drug than with the placebo. A significant drug effect (leucocytosis) was reversible after cessation of drug administration. One subject with reduced thyroid function at the start of treatment developed hypothyroidism after drug administration.

### Implications

These research findings indicate that calcium carbimide is both effective and safe in alcoholic patients. It exerts short-term efficacy without exerting clinical toxicity, except in patients with decreased thyroid function. However, patients' medical condition must be evaluated prior to the start of treatment. Patients with reduced thyroid function should not receive the drug treatment.

#### Selected Publications

- Peachey, J.E. and B.M. Kapur. "Monitoring Drinking Behaviour with the Alcohol Dipstick During Treatment." *Alcoholism: Clinical and Experimental Research* 1986; 10: 663-666.

#### Biomedical Research (Clinical Institute Division)

**Investigators:** J.E. Peachey with H.M. Annis

## 106

### Controlled Study of Self-efficacy and Calcium Carbimide (Temposil®) in Alcoholism Treatment

Alcoholism treatments are generally effective in assisting alcoholics to stop drinking but are ineffective in maintaining abstinence over long periods. Recently, a performance-based behavioural treatment strategy aimed at increasing alcoholics' perceived ability to cope effectively with high-risk drink-

ing situations (self-efficacy treatment) has been developed and studied in the ARF Clinical Institute by Dr. H.M. Annis (see Research Entry #86). As an extension of this research, an integrated treatment strategy has been developed for chronic alcoholics in which the pharmacological adjunct calcium carbimide (Temposil®) is integrated with self-efficacy treatment.

#### Research

This research was initiated to develop and evaluate an innovative treatment for alcoholic patients – the integrated use of relapse prevention and the alcohol-sensitizing drug calcium carbimide. In the clinical study, the efficacy of such a treatment approach was compared with the more traditional method of prescribing the drug by a physician (calcium carbimide and advice-only group). Follow-up of patients has been completed at six, twelve, and eighteen months. The follow-up results concerning efficacy of this integrated treatment method are being analyzed. Preliminary findings appear encouraging.

#### Implications

Work in this program will contribute to more effective treatment of alcohol abuse. In particular, if the results favour the combined approach, a low-cost treatment strategy will be developed for use by family practice physicians in dealing with patients who have drinking problems.



J.E. Peachey

#### Biomedical Research (Clinical Institute Division)

**Investigators:** J.E. Peachey with H. M. Annis

## 107

### Pharmacotherapies for Smoking Cessation

More effective treatment is needed for dependent users of tobacco who wish to become abstinent. While a variety of pharmacotherapies exist that can be used alone or in conjunction with behavioural support to achieve this end, new pharmacotherapies are sought. A commonly used pharmacotherapy is nicotine-containing resin (gum) which is chewed slowly to release nicotine that is absorbed through the mouth. Blood nicotine levels are generally lower than those obtained through cigarette smoking.

Clinical trials are being conducted to evaluate new pharmacotherapies for smoking cessation and control of associated recidivism and to develop new and improved techniques for their effective clinical use. The objective is to identify and evaluate non-nicotine drugs that regulate satiety, or that may mitigate withdrawal symptoms. Of particular interest are compounds that affect serotonin (a neurotransmitter in the brain).

#### Research

Clinical trials are conducted on both inpatients and outpatients. Dependent smokers (a five-year history of smoking 20 cigarettes a day or more) are studied in abrupt withdrawal from smoking (seven days) to assess the efficacy of withdrawal treatment. Patients are monitored to measure changes in tobacco consumption under drug treatment (after three to four weeks), or are assessed over a longer period (six months to a year) to see if any cessation benefit is derived from these new compounds. Studies are being planned on recidivism. Two studies of the efficacy of serotonin

modulators as adjuncts to smoking cessation will be initiated in 1989.

### Implications

It is believed that the ultimate outcome will be the development of more effective and safe treatments for achieving and maintaining tobacco abstinence.



R.C. Frecker

#### Selected Publications

- Bendayan, R., J. Sullivan, C. Shaw, R.C. Frecker and E.M. Sellers. "Effect of H<sub>2</sub>-receptor Antagonists on Nicotine Disposition." [Abstract] *Clinical Pharmacology and Therapeutics*. 1988; 43: 124.
- Lux, J.E. *A Clinical Study of the Pharmacology of an Inhaled Nicotine Aerosol*. PhD Dissertation, Department of Pharmacology and Institute of Biomedical Engineering, 1987.
- Lux, J.E. and R.C. Frecker. "The Generation of a Submicrometre Nicotine Aerosol for Inhalation." *Medical and Biological Engineering and Computing* 1988; 26(2): 232-234.
- Lux, J.E. and R.C. Frecker. "A Comparison of Nicotine Administered by Aerosol Inhalation and Intravenous Injection." *Clinical Pharmacology and Therapeutics* 1986; 41(2): 230.

#### Grants

Work in this program is financially supported by Lilly Research Laboratories (Indiana, U.S.) and Glaxo Group Research (England).

#### Biomedical Research (Clinical Institute Division)

**Investigators:** R.C. Frecker with E.M. Sellers

108

### Smoking Cessation Research

The Foundation is asked regularly for advice on the selection of smoking cessation treatments. In conjunction with the provision of this advice as well as treatment services in the Outpatient Primary Care Clinic, research is conducted into various techniques of smoking cessation.

Individuals with alcohol and drug dependence are also very likely to be

dependent on cigarettes. Treatment techniques are needed to deal with the special problems of the smoker who abuses other substances.

#### Research

1. Nicorette® (nicotine-containing gum) is the only prescription product proven to be useful in the treatment of cigarette smoking. Nicorette has been available in Canada since 1979. This program is using Nicorette to treat smokers who have been dependent on other drugs. The ability of Nicorette to inhibit smoking (as measured by changes in alveolar carbon monoxide levels) has been studied in a trial using volunteers from the Employed Problem Drinker, Problem Drug-User Program.
2. The Ontario Lung Association (OLA) runs an inexpensive, seven-session, group cessation program. It is available to smokers in communities throughout Ontario. A computer data base is being created at the Foundation to assist the OLA in monitoring the success of their province-wide group smoking-cessation program. In addition to describing and evaluating this smoking treatment program, predictors of smoking cessation are being explored. Analysis of the results of about 1000 smokers is under way.

#### Implications

The evaluation of the OLA program will continue with special emphasis on a few locations that see many smokers each year. There are also plans to expand the Nicorette Clinic. Continued work in the area of smoking treatment should lead to a better understanding of how to help smokers stop smoking and of basic processes involved in smoking cessation.

#### Selected Publications

- Kozlowski, L.T. "Finding Help to Quit Smoking" *Harvard Medical School Health Letter*, November, 1987.

•Kozlowski, L.T. and S. Herling. "The Use of Objective Measures in Smoking Treatment." In *Assessment of Addictive Behaviours*, eds. Donovan, D. and A. Marlatt. Guilford Press, 1988.

•Kozlowski, L.T. and A. Page. "A Second Look at the Effects of Supportive Follow-up on Smoking Cessation." *Canadian Medical Association Journal* 1987; 137: 605-607.

•Kozlowski, L.T., W. Skinner, C. Kent and M.A. Pope. "Prospects for Smoking Treatment in Individuals Seeking Treatment for Alcohol and Other Drug Problems." *Addictive Behaviors*, in press.

#### Grants

The Ontario Lung Association has provided two small grants to aid in the costs of data management.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** L.T. Kozlowski, W. Skinner and C. Kent

## **Education, Training and Consulting Services**

**109**

### **Evaluation of the Kitchener/Waterloo Assessment/Referral Service**

The Kitchener/Waterloo Assessment/Referral Service was established by the Addiction Research Foundation in 1984. In addition to providing high-quality services to the people in the Kitchener/Waterloo area, the service aims to be a demonstration and training resource for other assessment/referral services. The service is also expected to develop, support and evaluate innovative methods of service delivery. The service was carefully monitored during its first two years of operation. As was hoped, it attracted large numbers of people with alcohol and drug problems and made referrals to a wide range of community services. Client satisfaction was very high.

#### **Research**

The current phase of this evaluation concerns the views of local professionals and of workers in other assessment/referral services.

1. A mail survey of over 200 health and social service professionals in the Kitchener/Waterloo area was completed in 1987. The survey found that, in general, these professionals were aware of the Kitchener/Waterloo Assessment/Referral Service and regarded it as a valuable service to the community. Most also indicated an intention to refer alcohol and drug-using clients for assessment. Specific suggestions for improving the service were made by some respondents.

2. A telephone survey of directors of other assessment/referral services is currently under way. This seeks to assess the extent to which these directors view the ARF service as a useful demonstration and training resource and to invite suggestions for improving this aspect of the service.
3. An analysis of staff time spent on various case management activities was undertaken. This survey will be used as part of the evaluation for a future study involving the use of self-help materials for early-stage problem drinkers. It is expected that the use of these materials will reduce the amount of time staff need to spend with some types of clients.
4. The characteristics of clients who fail to show up for their appointments have also been examined. This review indicated that "no-shows" were more commonly younger clients and that this needs to be considered when setting up appointments and sending out reminders.

#### **Implications**

The results of these surveys will be used to improve this and other assessment/referral services. The work will also help the service to plan for future training endeavours.

#### **Community Programs Evaluation Centre**

**Investigators:** A.C. Ogborne, with M. Gavin and B. Newton-Taylor

**110**

### **Employee Assistance Program Survey**

In the 1970s and 1980s the Addiction Research Foundation has been aggressively promoting the development of Employee Assistance Programs (EAPs) throughout Ontario.

Due in part to these efforts, and the efforts of others, the percentage of workplaces with EAPs has increased rapidly. However, reliable estimates are not available regarding the current number of EAPs, the work sectors in which they are concentrated, and the characteristics of the EAPs in terms of the Foundation's best advice. Previous studies in which these estimates have been addressed were not representative of Ontario.

#### **Research**

Survey instruments and procedures designed to assess the nature and extent of Employee Assistance Programs throughout Ontario have been successfully piloted in the Niagara region. Results from this survey indicate that

- 40 of 163 worksites with over 50 employees had EAPs
- many worksites wished to establish or revise an existing EAP
- most EAPs had components consistent with the ARF's best advice.

Prevalence of problems in the worksites showed that

- absenteeism was 6.5 days lost per person per year
- on-the-job accidents were 9.2 per 100 employees per year
- approximately 4.2 per 100 employees per year used the EAP.

A province-wide survey utilizing a 10 per cent systematic sample from the 9600 worksites with 50 or more employees is now being conducted. This survey will provide a more representative picture of the nature and extent of EAPs across the province and among different work sectors.

#### **Implications**

The information from the survey will aid Foundation employee assistance consultants to identify and develop more efficient strategies to intervene with worksites for EAP development

purposes. The survey will provide useful baseline data for each work sector, norms of absenteeism, accident rates, grievances rates, and EAP referral rates. In addition, a better understanding will be gained about the relationship between EAPs and their components, and the prevalence of problems in workplaces.



**Community Programs Evaluation Centre**  
**Investigators:** S. Macdonald with S. Dooley

S. Macdonald

## 111

### Employee Assistance Program Monitoring

In collaboration with Central Ontario Grocers (People and Profits Division) a new computer software program called *Employee Assistance Programs EAP Analyst* has been developed. The program, adopted from the Metro Toronto Monitoring system, allows client organizations to document the characteristics and outcomes of individuals who use the Employee Assistance Programs (EAPs). The original monitoring system, developed about 10 years ago, has been used on paper by about 10 organizations.

#### Research

The software package is being promoted for use by workplaces with EAPs and to date, about 10 organizations have adopted the system. For smaller worksites that cannot justify setting up their own computer systems, the Foundation is offering to

conduct analyses of the referrals. It is hoped that over time, accurate baseline data on the rates and characteristics of EAP referrals will be available for different work sectors in Ontario.

#### Implications

This computer software program will facilitate much quicker access of aggregated information for the user organizations than the old paper system. The data themselves are useful for tracking individual referrals and monitoring the overall effectiveness of the EAP and EAPs in general.

#### Selected Publications

- Macdonald, S., W. Albert, M. Maynard and P. French. "Survival Analysis to Explore the Characteristics of Employee Assistance Program (EAP) Referrals that Remain Employed." *International Journal of the Addictions*, in press.
- Community Programs Evaluation Centre**, in collaboration with the Metro Toronto Region Employee Assistance Program Centre
- Investigators:** S. Macdonald and L. Hershfield, with W. Orgias and P. French

## 112

### The Response of the Health Professions to Alcohol and Other Drug Problems Among Their Members

Problems with alcohol and other drugs among physicians have been recognized for hundreds of years, but there has been increasing interest in them in the past decade. In Ontario, the Doctors on Chemicals (DOC) program was formed in 1977 under the leadership of the College of Physicians and Surgeons of Ontario, in collaboration with the ARF's Clinical Institute, the Donwood Institute and the Ontario Medical Association. In addition to assisting physicians who have drug problems, this program supports initiatives in prevention, education and

research. One of the DOC programs is the Physician Advocates of Ontario, a province-wide network of physicians who help colleagues with problems to find appropriate treatment and re-enter practice after treatment.

More recently, representatives of the professions of dentistry, medicine, nursing, pharmacy, and veterinary medicine have come together to form the Ontario Health Professionals Assistance Program (OHPAP) to help members of their professions who have problems with alcohol and other drugs. This interdisciplinary group provides a vehicle through which the five professions can cooperate in the sharing of information, education and training, research, and assessment and referral of professionals with problems.

Members of the Department of Psychiatry have been closely associated with the development of these Ontario programs, and this line of research has grown in association with these initiatives.

#### Research

An ongoing study of the Ontario Physician Advocate Program is being carried out. Advocates regularly report on their contacts with troubled physicians and what assistance they offer. Preliminary results show that the advocates represent a broad range of medical practitioners, and there is great variability in the number of physicians that they help. This study is nearing the end of its initial two-year period, and will be evaluated before continuing.

Of potentially great significance is the development of a computerized bibliography of the vast literature in this area. The literature will be indexed on variables that are relevant to the issues in this field, with some hierarchical categories of variables.

The ability to search on combinations of these variables will make it uniquely useful to researchers working in this field.

Preliminary work has also been done on a method of recording contacts between health professionals and the various programs that have been set up to help them deal with alcohol and other drug problems.

#### **Implications**

The Physician Advocates of Ontario are unique in terms of the treatment of professionals. They are also an example of the self-help programs that are a significant part of the treatment of alcohol and other drug problems (e.g., Alcoholics Anonymous). This study of the Physician Advocates may shed light on the development and functioning of such programs, and the way in which a specialized self-help program evolves to meet the needs of a special population.



*J.M. Brewster*

**Biomedical Research  
(Clinical Institute  
Division)**

**Investigators:** J.M.  
Brewster with F.B. Glaser

### ***Goal 3: To develop better prevention programs and services and to make them available to people in Ontario.***

The ARF creates prevention and health promotion methods and services for two groups: community services workers and the public. Goal 3 addresses community service workers, specifically those in: health and human services, the education system, the workplace, law enforcement services, judicial services, correctional services, legislative and regulatory bodies. (Goal 4 addresses the public.)

Foundation research on use and problem patterns and control measures (Goal 1) is used extensively in the design of prevention and health promotion programs. In addition, specific research is undertaken to determine programming needs, monitor utilization and evaluate program effectiveness and efficiency. Such research is conducted in support of programming in four areas of high priority:

In support of the ARF's primary and secondary school initiatives, research is focused on:

- assessment of needs for curriculum elements and programs
- evaluation of school policies, curriculum guidelines and resource materials
- monitoring utilization of effective policies and programs

As part of working with selected community groups, research is focused on:

- identification of effective programs and strategies for dissemination in Ontario
- evaluation of efficiency and effectiveness of selected prevention programs and services in Ontario

In an effort to implement more effective health promotion programs in colleges and universities, the following areas of research are considered priorities:

- evaluation of the efficiency and effectiveness of selected prevention programs and services in Ontario
- monitoring use and problem patterns of post-secondary students

School initiatives



Community group initiatives



College and university initiatives



Workplace initiatives

Research is also integral to the ARF's health promotion programs in the workplace, in particular:

- needs assessment for workforce prevention and health promotion programs and services
- evaluation of selected health promotion EAP methods, instruments and services

113

## Drug Education Program Research in Ontario School Systems

Foundation researchers have been working to identify the characteristics of effective drug education programs for school populations, with special attention given to alcohol and cannabis. Previous work associated with the dissemination of alcohol lesson plans indicates that more attention should be given to the reasons why programs are or are not used.

### Research

The objective of this research study is to identify or, where lacking, to develop school-based drug education programs that have the highest potential for preventing drug abuse among Ontario students. Recent research examines the process of program dissemination and utilization, and work with a Metropolitan Toronto school board has examined the process of implementation of a new curriculum. Of special interest has been the influence of teacher training on

- teachers' concerns regarding program implementation
- teachers' utilization of a new curriculum
- students' knowledge, problem solving and coping skills, attitudes toward planned decision making, behavioural intention and tobacco and alcohol use.

A curriculum guide entitled *Drug Abuse Prevention Project: An Educational Resource (DAPPER)* was designed, implemented and evaluated among primary and junior division teachers in the York Board of Education area. Emphasis in the curriculum is on developing decision-making and problem-solving skills.

### Implications

This research has significance to curriculum developers and school administrators, since it is concerned with the weakest link in the drug education process, namely, program implementation. Results of this project will be used to help plan the new ARF program of research being developed in Workplace, School and Family Systems Research.



K. Allison

### Selected Publications

- Goodstadt, M. "Prevention Strategies for Drug Abuse." *Issues in Science and Technology* 1987; 3(2): 27-35.
- Goodstadt, M. "Alcohol Education Programs in School Settings." *Advances in Adolescent Mental Health* 1986; 2: 219-230

• Goodstadt, M. "Alcohol Education Research and Practice: A Logical Analysis of the Two Realities." *Journal of Drug Education* 1986; 16: 349-365.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Services Division

**Investigator:** K. Allison, with M. Goodstadt

114

## Surveys of Drug Education in Ontario School Systems

Biennial Ontario School Surveys have been conducted since 1977 to identify the needs of Ontario school system personnel and students. These surveys, which have included a series of questions regarding students' recall and evaluation of drug education to which they have been exposed, have provided an ongoing assessment of the level of drug education in Ontario schools. The focus has been on drug education in general; specific attention has been given to alcohol and cannabis education.

Complementing the surveys of Ontario students, there have been two surveys of drug education resources and needs, as identified by school board personnel. The original survey was conducted in 1981; the second in 1986. These surveys have documented the status of drug education programs in the province and the results have been included in written and verbal presentations to education decision makers.

### Research

Current analysis of data, based on the 1987 survey, focuses on the relationship between drug education and drug use, and on the influences of such factors as peer pressure and availability on drug use. The 1989 survey will include some new items dealing with the school itself as an environment affecting decision making concerning drug use.

Future directions for this work are an examination of trends in the relationship between drug education and drug use, and an exploration of the relationship between individual factors, environmental (school) factors and drug use.

### Implications

The results of this research are made available to education decision makers with the aim of increasing the prevalence of relevant and effective drug education in Ontario schools. Further Ontario School Surveys will continue to provide data that will allow the Foundation to track the level of drug education in Ontario, and to make recommendations regarding government and community educational responses to drug use in the province.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Services Division

**Investigator:** K. Allison, with M. Goodstadt

**115****Monitoring the Impact of School Policy**

Many school boards in Ontario do not have policies designed to deal with alcohol and drug use problems among their students. Consequently, problems are often dealt with on a haphazard basis with little consistency. Those policies that do exist seem to lack certain crucial components (e.g., program and legal implications).

A model policy, entitled *Alcohol and Drugs: Policy Strategies for Ontario Schools*, was developed by the ARF with legal input from R. Solomon, Professor of Law at the University of Western Ontario. This model is intended to serve as a framework for developing similar policies across the province. The policy outlines procedures and provides a rationale for the inclusion of the following components: prevention, early intervention and disciplinary options. The policy also includes a section on the legal rights, powers and obligations of educators.

**Research**

In collaboration with senior representatives of boards of education in Ontario, information will be collected to determine awareness of the ARF program, the extent of its utilization, the number of schools involved, problems with the procedures and need for changes, additions and deletions.

**Implications**

The data collected in this study will provide ARF consultants with information about board interest and techniques, which may help in their dealings with boards. The survey will also provide detailed information about the penetration of the ARF philosophy

regarding alcohol and drugs in the school system, and an indication of what curricula are being used. Periodic surveys of this type, perhaps triennially, will allow for updates for programming purposes.

**Community Programs Evaluation Centre**

**Investigator:** L. Gliksman

**116****The Drinking, Drug Use and Lifestyle Patterns of Ontario University Students**

The ARF has developed and marketed a program designed for students entering first-year university. The program provides students with information, through a variety of media channels, about appropriate and inappropriate drinking practices and behaviours in this environment. At the same time, administration, student leaders, and student bar managers are jointly involved in the establishment of policies that control alcohol sales and use, and are designed to complement and enhance the educational component.

This program was developed in response to concerns about drinking among university students, and other problems that may be associated with drinking. Other research, primarily in the United States, has tried to relate alcohol use to these other problems, but no large-scale studies of this type have taken place in Canada.

**Research**

The present research study will provide data on the alcohol, drug, and lifestyle behaviours of a large sample of Ontario university students. The method employed in this study was a general mail survey of a random

sample of university students attending four universities across Ontario. A total of 13,200 surveys were sent out and 4911 usable questionnaires were returned and are currently being analyzed.

A second feature of the methodology allows for tracking of nonrespondents to solicit their co-operation by telephone. One hundred additional questionnaires were sent out to those contacted by telephone who agreed to fill out the survey (virtually no one refused the telephone request). Seventy-four of these surveys were returned. Preliminary comparisons between these 74 respondents and a random sample of 74 mail respondents suggests that the mail respondents are representative of the entire undergraduate student body.

The information collected will provide knowledge about changes in behaviour of students as they progress through university, and whether specific factors such as gender, religious affiliation, academic performance and ethnic background are related to use and abuse of substances. Comparisons with other university populations (e.g., U.S. students) will be possible because of the similarity of the survey instrument with those used previously. In addition, the survey instrument incorporates questions on drug-taking behaviours of university students which have been used with high school students in Ontario, so trends will be established over an increased period of time.

**Implications**

The data from this study are important in planning and delivering health promotion interventions and providing a baseline to facilitate evaluation of future interventions. The data can

also be used to identify those segments of the overall student population that may benefit most from interventions. This has implications for the potential expansion and refinement of the ARF's campus programming to include other lifestyle behaviours that are problematic for university students.

#### **Selected Publications**

- Gliksman, L. "Evaluation of the Campus Alcohol Policies and Education (CAPE) Project." *Prevention: Alcohol and the Environment: Papers and Reports from a Symposium held in Toronto, Canada, March 18-19, 1985*, eds. Geisbrecht, N. and A.E. Cox. Toronto: Addiction Research Foundation, 1986: 43-57.
- Gliksman, L., R. Engs and C. Smythe. *The Drinking, Drug Use and Lifestyle Patterns of Ontario's University Students*. Addiction Research Foundation, 1989.

**Community Programs Evaluation Centre**, in collaboration with Prevention Studies (Social and Biological Studies Division)

**Investigators:** L. Gliksman, with R. Engs and M. Goodstadt

**117**

### **Alcohol and Drugs in the Workplace**

Alcohol abuse in the workplace continues to be a major problem affecting up to 15 per cent of all employees; drug abuse in its various forms affects about 5 per cent, some of whom are cross-addicted to alcohol.

This program has been jointly developed with Health and Welfare Canada and is based upon the findings of earlier research, summarized in *Healthier Workers: Health Promotion and Employee Assistance Programs*. *Healthier Workers* describes two major prevention projects that were found to have at least some of the intended effects on alcohol and, to some extent, drug use. The book also contains a rationale for coordinating employee assistance and health promotion programs, which empha-

sizes their greater effectiveness and efficiency when run as part of a comprehensive health plan.

The conceptual model guiding the inquiry sees a close relationship between physical and mental health and sees individual health as being influenced by the technical, physical and psychosocial environment in which workers live. The philosophy of the research is that workplace interventions should be founded upon identified worker needs and risks. Alcohol and drug use are considered in this context, as are programs and interventions aimed at the prevention and remediation of abuse.

The objective is to develop a comprehensive employee health and assistance intervention strategy capable of national application, with special emphasis on developing more effective preventive and remedial programs for alcohol and drug abuse.

#### **Research**

A number of related projects are currently active:

1. Needs and risks surveys in selected worksites have been conducted and programs are being developed and evaluated based on the results. This aspect of the program currently involves five worksites in both the public and private sectors and a total of about 6000 employees covering a wide variety of occupations. Particular emphasis is upon low-income women, blue-collar males and middle- and upper-level managers. The health risks and needs of these groups have been neglected in previous employee assistance and health promotion programs. The results have been reported to chief executive officers, union presidents and the relevant worksite committees.
2. The program development phase, emanating from the health needs and

risks surveys, has begun in all worksites.

3. A short form of the health needs and risks questionnaire has been developed and tested in one worksite. This short form will be evaluated further and the manual for its use elaborated and field tested.

4. A statistical model of the influences upon wellness has been developed. In the context of this model, a better understanding of the relationship of alcohol, tobacco and drug use to wellness is derived. This knowledge provides programmers with helpful ideas on how to approach employee concerns about the use of these substances through a health promotion route.

5. In one site it has already been agreed that an employee assistance program with voluntary and formal components, as well as a health promotion program, will be implemented over a three-year span. The plan also calls for a review of the impact of all management policies on employee wellness.

6. A "do-it-yourself" survey and action method is being developed that will enable employers to conduct health needs and risks analyses in their own worksites, using their own resources.

#### **Implications**

Focus group methods will be developed that will aid in validation of survey results and lead to further conceptualization of health needs and risks. This, in turn, will lead to formal designation of workplace programs and interventions. In addition, emergent programs and interventions will be evaluated with regard to their impact on alcohol and drug use.

It is anticipated that alcohol and drug users will be better served through programs based on these analyses than through programs that

make false assumptions about the needs and risks of these users.

**Selected Publications**

•Shain, M., H. Suurvali and M. Boutilier. *Healthier Workers: Health Promotion and Employee Assistance Programs*. Lexington, Massachusetts: Lexington Books, 1986.

**Grants**

This project is sustained by operating funds from Health and Welfare Canada.

**Prevention Studies (Social and Biological Studies Division)**, in collaboration with the Community Services Division

**Investigator:** M. Shain

**118****Community Prevention Research Symposium**

Recent years have seen the development in a number of countries of research-oriented projects in community development around alcohol issues. These projects have taken various forms and often include alliances with local interest groups or authorities on issues relevant to preventing alcohol problems. Each project has developed a rich store of expertise and experience in the pitfalls and promises of such efforts, but this experience has seldom made its way into formal evaluative research reports.

**Research**

A five-day symposium (scheduled for March, 1989) is being organized, which will bring together investigators of demonstration projects with a substantial monitoring and assessment component. Participants, including representatives from a number of alcohol/drug agencies, will address key issues pertaining to rationale, methodology, community development activities, community response and impacts of their prevention projects. Of particular

interest are the interactions between the change agents and/or researchers and the community, modifications of the studies' aims and means, and problems experienced in the course of conducting the studies. The objective is to document, compare and assess these research-oriented projects in order to draw general lessons and facilitate appropriate and effective approaches in the future.

**Implications**

It is proposed that a monograph be prepared on the key findings, lessons and recommendations of the symposium. In addition, material may be developed for the general public based on the findings and outcomes.

**Grants**

Support and sponsorship for this work is being provided by Health and Welfare Canada and the U.S. Office for Substance Abuse Prevention. The meeting is co-sponsored by the Foundation, Health and Welfare Canada and the U.S. Office for Substance Abuse Prevention.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** N. Giesbrecht, P. Conley, R. Denniston, L. Gliksman, H. Holder, R. Room, I. Rootman and M. Shain, with other contributors to the symposium.

**119****Evaluation of a Drinking and Driving Countermeasures Program Based on the Health Belief Model**

Numerous school-based programs have been designed to educate students about the hazards of drinking and driving and to prevent future incidents. The results of these programs have been equivocal at best, perhaps because many are designed in the absence of a theoretical model that would serve to direct the program.

One such model, which has had some success in other areas, is the Health Belief Model. It was first postulated in an attempt to understand the failure of individuals to accept disease preventives or receive tests for asymptomatic disease. The model has been applied to numerous other health-related issues, including alcohol and drug use. The model predicts that the likelihood of an individual undertaking any health behaviour is a function of the perceived magnitude of the threat to his or her health and the perception of the effectiveness of a specific behaviour in dealing with that threat.

**Research**

The present research is designed to: (1) evaluate the efficacy of the Drinking and Driving Countermeasures Program; and, (2) address the value of the Health Belief Model in explaining adolescent drinking and driving behaviour.

The intervention consisted of a mock coroner's inquest and three accompanying lessons delivered in class by teachers. Using a pre/post/follow-up test sequence, in an experimental/control design, students in four high schools filled out questionnaires in the fall of 1987, in December of 1987, and in the spring of 1988.

Although the school-based Drinking and Driving Countermeasures Program was not designed with the Health Belief Model as its guiding force, it has all the elements deemed important by proponents of the model. Accordingly, the variables were designed to assess impact of the program on issues of susceptibility, seriousness and effectiveness, as well as knowledge and general attitudes.

The results indicated that the program was well received by both

students and teachers, and resulted in knowledge gains and increased perceptions of the seriousness of drinking and driving at post-test and follow-up. No other measures, including those designed for assessment of the Health Belief Model, showed program impact.

### Implications

The results of this study suggest that the Health Belief Model may not be an appropriate model for use with young people. The model stresses susceptibility to complications arising from risky behaviour. However, part of the rites of passage from childhood to adulthood is the rebellion of the adolescent against structure and security. Coupled with a teenager's feelings of personal immortality, it may make the model inappropriate. While the Health Belief Model proved inappropriate, the program has had some success. It provides useful information in an interesting manner and produces some positive effects.

### Selected Publications

- Smythe, C.L., P. Stanghetta and L. Gliksman. *An Evaluation of a School-based Drinking and Driving Countermeasures Program Based on the Health Belief Model*. Addiction Research Foundation, Internal Document No. 97, 1988.

### Community Programs Evaluation Centre

**Investigators:** L. Gliksman and C.L. Smythe, with P. Stanghetta

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## Evaluation of Server Training Program

A number of approaches have been utilized to try to prevent drinking and driving, such as increased police surveillance by means of spot checks and education, primarily through mass media campaigns. More recently, an attempt has been made to attack the

problem at a point of alcohol consumption – the licensed establishment. By involving the licensed establishment in setting up policies that guide the sale of alcohol, and by training servers in responsible serving practices, it is hoped that the problem can be controlled by reducing the incidence of individuals reaching the point of impairment.

The ARF has developed a server training program and is currently marketing it. This program, which differs from many of the others developed in the United States and Canada, provides a course for managers and owners and assists in establishing policies unique to that establishment. The training segment for servers outlines their legal obligations and rights and provides them with clear and precise steps to limit impairment. It is designed primarily to prevent intoxication rather than to manage those who become intoxicated.

### Research

This research project was designed to determine the effectiveness of the Server Training Program. The methodology was designed to assess the reactions of servers who have been trained and compare their serving behaviours with those of untrained personnel in response to staged events.

The initial results have been encouraging. Servers seem to enjoy and learn from the training session. Most importantly, the preliminary evidence indicates that servers put what they learned into practice. Trained servers exhibited significantly better serving practices after the training than untrained servers in matched comparison sites.

### Implications

Future research in this program will attempt to expand the scope of the study to include more licensed establishments (and hence servers) and to assess the long-term impact of the program on servers and patrons.

### Selected Publications

- Gliksman, L., E. Single, S. Brunet, R. Douglas and K. Moffatt. *An Evaluation of the Server Intervention Program Entitled 'A Guide to the Responsible Service of Alcohol'*. Report presented to the Health Services and Promotion Branch of Health and Welfare Canada, July, 1988.
- Simpson, R., S. Brunet, R. Solomon, P. Stanghetta, E. Single and R. Armstrong. *A Guide to the Responsible Service of Alcohol: Trainer's Manual*. Toronto: Addiction Research Foundation, 1986.
- Simpson, R., S. Brunet, R. Solomon, P. Stanghetta and R. Armstrong. *A Guide to the Responsible Service of Alcohol: Manual for Owners and Managers*. Toronto: Addiction Research Foundation, 1987.
- Simpson, R., P. Stanghetta, S. Brunet, E. Single, R. Solomon and W. Van de Klundert. *A Guide to the Responsible Service of Alcohol: Server's Manual*. Toronto: Addiction Research Foundation, 1986.

### Grants

This study was supported by the Health Services and Promotion Branch of Health and Welfare Canada.

**Community Programs Evaluation Centre**, in collaboration with Prevention Studies (Social and Biological Studies Division)

**Investigators:** L. Gliksman and E. Single, with S. Brunet, R. Douglas and K. Moffatt

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## The Future of Tobacco Use

Until the early 1980s the prevalence of smoking was declining for males, and increasing for some groups of females. However, smoking prevalence is now declining for both sexes. This decline is likely to continue, because more smokers are quitting and fewer individuals are starting to smoke.

This new area of research is investigating the population of smokers of the future, including the attributes of

smokers who are likely to continue to smoke. One method of doing this is to consider research that has dealt with the characteristics of smokers which are associated with quitting smoking. One can turn the results of such studies upside down, to derive a profile of quit-resistant smokers.

The value of this research is twofold. First, programs aimed at reducing smoking prevalence will need to take into account the changing nature of the target population. Second, the decline in smoking prevalence will be accompanied by an increasing perception of tobacco use as drug addiction. It also enhances understanding of how prevalence interacts with the popular conception of addiction and contributes to knowledge of trends in addiction.

#### Research

Work on this project in 1986-1987 consisted of library research in the preparation of a book chapter on this topic and obtaining existing data sets to re-analyze them in terms of quit-resistant smokers. The results of this work have been very promising to date and may shed light on important future smoking issues.

#### Implications

This research contributes to a greater understanding of the demographics of smoking in the future, and the similarities between tobacco use and other substance abuse. Further analyses of existing data sets will be conducted in terms of quit-resistant smokers.

#### Selected Publications

- Coambs, R.B., L.T. Kozlowski and R.G. Ferrence. "The Future of Tobacco Use and Smoking Research." In *Smoking and Human Behaviour*, eds. Ney, T. and A. Gale. Chichester, England: John Wiley and Sons, 1989: 337-348.



R.B. Coambs

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** R.B. Coambs, with L.T. Kozlowski and R.G. Ferrence

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### Dependence and Denial in the Smoker Population of the Future

This research is related to a concurrent project studying the future of tobacco use (see Research Entry #121). It is concerned with quit-resistant smokers, and expands on earlier research by examining the patterns of dependence and health attitudes in this quit-resistant group. The purpose of the project is to identify characteristics of smokers who are unlikely to quit. This will increase understanding of the factors that cause some smokers to resist quitting and describe future smokers (mainly the quit-resistant smokers of today). This is important for the addictions field because programs aimed at reducing smoking prevalence will need to take into account the changing nature of the population involved in substance abuse.

#### Research

The objective of this research program is to investigate the characteristics of future smokers. In collaboration with Labstat Inc., a random-sample survey of smokers in Kitchener, Ontario, was conducted. Respondents were divided into *likely to quit* and *not likely to quit* groups. The *not likely to quit*, or quit-resistant group, consisted of those who had never attempted to quit or those who expected to be smoking in five years. The *likely to quit* group consisted of those respondents who had attempted to quit in the past, and who indicated that they would not be smoking in five years.

Three types of questions were used to classify respondents: (1) concern for the health effects of smoking (effects of smoking on own health and on health of others); (2) socio-demographic questions (age, sex, age started smoking); and (3) measures of physical dependence (number of cigarettes per day, time to the first cigarette in the morning, salivary cotinine). Univariate techniques and logistic regression were used to predict the smoking status of the respondents. Health concern and dependence were found to be useful predictors of future smoking status.

#### Implications

This research will contribute to a better understanding of the changing nature of the demographics of smoking. It suggests that smokers are becoming more like other substance abusers. There is a relationship between smoking and other substance abuse. Smokers will be increasingly dependent on tobacco and are more likely to deny the negative health consequences of smoking, just as other addicts deny the negative consequences of their preferred drug.

In 1989, further analyses of the Labstat data set and a 1987 follow-up survey also conducted by Labstat will be examined.

#### Selected Publications

- Coambs, R.B., S. Li, L.T. Kozlowski, J.C. Robinson and W.S. Rickert. "Characterizing Future Smokers." In *Problems of Drug Dependence, Proceedings of the 50th Annual Scientific Meeting, Committee on Problems of Drug Dependence Inc.* NIDA research monograph, forthcoming.

#### Grants

Work in this program is supported by a grant from the National Health Research Development Program (NHRDP), Health and Welfare Canada.

#### Sociobehavioural Research (Clinical Institute Division)

**Investigators:** R.B. Coambs, with S. Li, L.T. Kozlowski, J.C. Robinson and W.S. Rickert

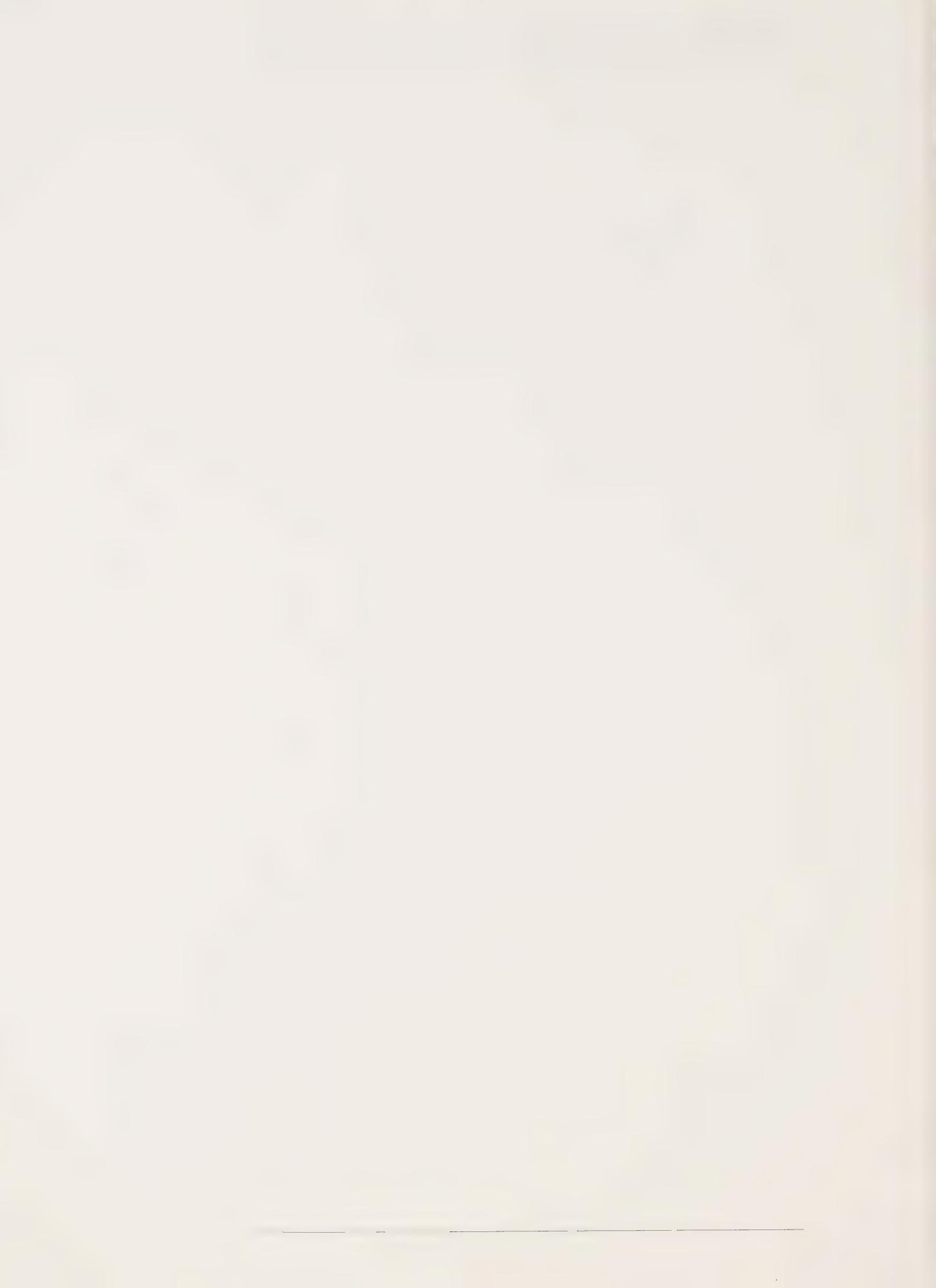
***Goal 4: To increase public awareness and knowledge about alcohol and drug problems, and to motivate the public and policymakers to take appropriate action.***

The ARF creates prevention and health promotion methods and services for two groups: community service workers and the public. Goal 4 addresses both the general public and their key influencers: policymakers, the media and, in the case of children and adolescents, parents and school staff.

Foundation research on use and problem patterns and control measures (Goal 1) and on prevention and health promotion programs (Goal 3) is used extensively in the design of information and advice programs. The primary foci of research activity to date in relation to Goal 4 have been:

- collection and dissemination of current statistical data to government officials, legislators, program planners, members of the media, community representatives and students
- preparation of best advice based on the analysis of available research for government officials, legislators and community leaders on subjects involving the use and abuse of alcohol and other drugs

In addition, ARF researchers review all ARF information and education programs and materials to ensure scientific accuracy.



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### Statistical Information Service

The Statistical Information Service Program was initiated by the Foundation in 1978 to meet the demand for promptly available statistical information, including the preparation of special information products. The program handles over 500 information requests yearly from Foundation staff, people working in government, legislators, program planners, administrators, researchers, members of the media, community representatives, students and interested lay persons. Topics include consumption patterns, legal controls, social problems, health care, morbidity, mortality and other areas pertinent to the alcohol and drug field.

#### Research

Specific activities of this program include directing people to data sources, providing data, advice on research methodology and interpretation of findings. Special information products such as handouts and fact sheets are developed for distribution to specified target group populations such as adolescents, young adults, the elderly, women, men and others, utilizing data from *Statistics on Alcohol and Drug Use in Canada and Other Countries* (see Research Entry #3, *Statistics on Alcohol and Drug Use*).

The statistical library contains over 20,000 documents in print, microfiche, computer printouts and machine-readable form, including published and unpublished information from government organizations such as Statistics Canada and Health and Welfare Canada, and large statistical research bureaus such as Gallup, in addition to municipal, provincial, federal and international sources. An Acquisition List is distributed on a

subscription basis periodically. Foundation staff members have borrowing privileges. A reference service is provided to all persons.

#### Implications

This information service contributes to greater public awareness and knowledge of drug use and problems in Ontario and Canada, including current status and historical trends. This work will continue in 1988-89, and will include, in particular, preparation of *Stats Facts* for inclusion in *The Journal* in the fall of 1988.

#### Selected Publications

- Adrian, M. "On the Use of Data Systems to Obtain Information on Alcohol and Drug Problems." In *Research Planning Group on Inter-American Epidemiological Surveillance Projects, International Drug Abuse Conference Report Binder*, eds. Madrigal, E. and M. Adrian. Miami, Florida, 1988; Sections 7,8,9.
- Adrian, M. "Drug Abuse." *Coaching Review: Canada's National Coaching Magazine* 1986; 9: 7.
- Adrian, M. "Drug Use and Canadian Teenagers" [Gary Swanson interviews M. Adrian]. *Listen - A Journal of Better Living* 1986; 39(6):20-22.

#### Prevention Studies (Social and Biological Studies Division)

**Investigators:** M. Adrian, with P. Jull, R. Williams, A. Manahan, V. Shehadeh, T. Williams and B. Shimizu

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### Information Service for International Statistics on Alcohol and Drugs

Statistical information on an international level is necessary for comparative research purposes and to inform policymakers and planners of the alcohol and drug experiences in other countries. Many countries, however, have relatively undeveloped resources and personnel for the collection and dissemination of such information. The objective of this program is to collect and disseminate

baseline statistical data for policy development and evaluation in the international context.

This program was formerly carried out as part of the Statistical Information Service Program, but has now taken on a special importance as a result of the redesignation of the ARF as a Collaborative Centre of the World Health Organization (WHO) for Research and Training.

#### Research

The program is giving special emphasis and focus to the following products and services:

1. The World Alcohol Project updates statistics on alcohol production, trade and consumption for 163 countries. This is a continuation of a project started several years ago in collaboration with WHO.
2. On the basis of international statistics previously compiled, a report on *International Statistics on Alcohol and Drugs* will be produced that will include data on alcohol consumption (expenditures, traffic accidents and liver cirrhosis mortality) and on drugs (production, use and expenditures and seizures of illicit drugs). These and other data will be produced through the consolidation of international statistics previously compiled, and will be made available.
3. Attention will be given to developing improved methods of data collection and, in collaboration with WHO, to providing training and education in the techniques of alcohol and drug statistics to representatives of other countries.

#### Implications

The information gathered and shared as a result of this program contributes to greater awareness and cooperation in the drug field on an international level.

**Grants**

Training for Dr. Ortiz and travel with regards to the PAHO Research Planning Group on Inter-American Surveillance Projects was funded by PAHO.

**Prevention Studies (Social and Biological Studies Division)**

**Investigators:** M. Adrian, with P. Jull and R. Williams

**125****Human Immunodeficiency Virus (HIV) Infection in Injection Drug Users (IDUs): Development of Best Advice Paper**

The available evidence suggests that currently there are between 50,000 and 100,000 IDUs in Canada who are potentially at risk of HIV infection. This group, located primarily in the metropolitan areas of Montreal, Toronto and Vancouver, constitutes the major source of spread to the non-drug-using community through sexual partners and perinatal transmission.

Although the apparent prevalence of HIV infection in heterosexual IDUs in Canada is still relatively low, practices that are known to be the source of viral transmission in this group are very common. These include sharing injection equipment and heterosexual and homosexual intercourse with multiple partners. Furthermore, drug shooting galleries operate in those areas where HIV infection is concentrated, namely Montreal, Toronto and Vancouver. Under similar circumstances, the prevalence of HIV-seropositivity has been found in some locations outside Canada (Milan and Edinburgh) to increase from 2 per cent to over 50 per cent within one or two years.

**Research**

A best advice paper is being developed to provide guidance to the

Ontario Ministry of Health and key Ontario health and social agencies regarding strategies and programs to prevent the spread of HIV infection in injecting drug users. The paper is to be based on a review of the literature, and consultation and participation in key Canadian and international meetings. This paper will be the first document of this nature to be made available.

**Implications**

Current evidence supports the view that, providing they do not succumb from other causes, all persons (including IDUs) who become infected with HIV, as well as those to whom they transmit the virus, will develop the acquired immune deficiency syndrome (AIDS) and die from that disease. Work in this program will aid responsible agencies in their efforts to prevent the spread of HIV infection and AIDS.



J.G. Rankin

**Selected Publications**

- Rankin, J.G. "Nonmedical Use of Psychoactive Drugs and Infection with Human Immunodeficiency Viruses." In *AIDS: A Handbook for Professionals*, eds. Snowden, D. and D. Cassidy. Toronto: Carswell Publications, 1988.

**Biomedical Research (Clinical Institute Division)**

**Investigator:** J.G. Rankin

**126****The Extent of Use of Very-low-alcohol Products by Elementary School Students in Ontario**

With the advent of the sale of very-low-alcohol beverages (i.e., less than 1 per cent alcohol by volume) in grocery

stores, concern has been raised about the use of these products by elementary school children, and the problems which they may be encountering. At the request of the Ministry of Consumer and Commercial Relations, a study was undertaken to answer these questions.

**Research**

Information was solicited from three key services: school systems, police departments and public health units. Surveys were mailed to all principals, chiefs of police (municipal and provincial) and medical officers of health. These individuals were asked to consult with their staff about their knowledge of the extent of use and problems associated with these products.

The results of the surveys were consistent across all three sources and suggested that use of these products was not widespread among elementary students, and that the number of problems associated with their use was very low.

**Implications**

The results suggest that these products should continue to be marketed for adults who wish a low-alcohol beverage. If marketing of these products were to be increased, perhaps another survey would have to be conducted to determine its impact.



L. Gliksman

**Selected Publications**

- Gliksman, L. *The Extent of Use of Very-low-alcohol Products by Elementary School Students in Ontario*. Report prepared for the Ministry of Consumer and Commercial Relations, Government of Ontario, 1987.

**Community Programs Evaluation Centre**

**Investigator:** L. Gliksman

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- Adrian, M. "Pill Popping: Recent Trends in Psychotropic Drug Utilization in Canada, 1977 to 1981." Presented at the 114th Annual Meeting of the American Public Health Association, Las Vegas, Nevada, September 28-October 2, 1986.
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- Adrian, M. and B.S. Ferguson. "Demand for Domestic and Imported Alcohol in Canada." *Journal of Applied Economics* 1987; 19: 531-540.
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- Annis, H.M. "Optimal Treatment for Alcoholism and Drug Dependencies." Presented to the Kaiser Permanente Medical Group, Los Angeles, California, 1988
- Annis, H.M. "Matching Clients and Treatments." Presented to staff of the Donwood Institute, Toronto, Ontario, 1988
- Annis, H.M. "Cost-effectiveness of Inpatient Rehabilitation: Brief Outpatient Treatment as an Alternative." Presented at the joint meeting of the American Medical Society on Alcoholism and Other Drug Dependencies and the Research Society on Alcoholism, San Francisco, California, 1986.
- Annis, H.M. "Treatment in Addictions." Presented at the Professional Staff Conference, Ontario Ministry of Corrections Services, Toronto, Ontario, 1988

**ARF Staff Publications and Presentations**

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- Annis, H.M. "A Relapse Prevention Model for Treatment of Alcoholics." In *Treating Addictive Behaviours*, eds. Miller, W.R. and N. Heather. New York: Plenum, 1986: 407-433.
- Annis, H.M. "Assessment and Treatment of Relapse in Alcohol and Drug Abusers." Presented at Corrections Approaching 2001, a conference sponsored by the Probation Officers Association of Ontario, Ministry of Correctional Services and the Ministry of Community and Social Services, Toronto, Ontario, November, 1987.
- Annis, H.M. "Relapse Prevention: Assessment and Treatment Strategies." Workshop given to the Psychology Department, Queen's University and Federal Correctional Staff, Kingston, Ontario, March, 1988.
- Annis, H.M. "Strategies for Treatment of the Alcoholic within Correctional Services." Presented at the Ontario Ministry of Correctional Services, Psychology Conference, Opinicon, Ontario, 1986.
- Annis, H.M. "Treatment of the Alcoholic Offender." Presented at the Solicitor General's Conference on Violence in Contemporary Canadian Society, Ottawa, Ontario, 1986.
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